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ORIGINAL COMMUNICATIONS.

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THE TREATMENT OF CICATRICAL WEB STENOSIS OF THE LARYNX AND TRACHEA.*

DR. HENRY LOWNDES LYNNAH, New York City.

Cicatricial web stenosis of the larynx and trachea, is one of the most frequent causes of the inability to permanently detubate and decannulate patients suffering from chronic laryngeal and tracheal stenosis following diphtheria. The diphtheritic lesion, however, and the hyperplasia which follows are not the only causes of the formation of these cicatricial webs, for they frequently follow injuries to the larynx, endoscopic operations for the removal of laryngeal papilloma, and plastic operations on the larynx and trachea.

The web stenosis may be located in the upper portion of the larynx and involve the ventricular bands, and leave only a small lumen for respiration in the posterior portion between the arytenoid eminences. This may be termed a supraglottic web. On the other hand, the vocal cords may be the chief site of web, and this not infrequently follows endolaryngeal operations for the removal of multiple papillomata. The writer has seen two post-operative papilloma cases develop marked anterior commissural webs involving the anterior third of the vocal cords, and making the cords very short and infantile. In both of these cases, however, there was a remarkably good voice; the web not interfering with the approxi-

*Read at the Twenty-fourth Annual Meeting of the American Academy of Ophthalmology and Oto-Laryngology, Cleveland, Ohio, October 16-18, 1919.

mation of the shortened vocal cords. In both cases the anterior web was easily removed, and there was no recurrence after one year.

In other cases the web stenosis may be subglottic, or may be deeply located in the region of the cricoid cartilage, or may even be located at the tracheal fistula. The writer has encountered two tracheal fistula webs. One followed an attempted plastic operation on the trachea, and the other was probably due to the prolonged use of an oversize tracheal cannula producing anterior and posterior spur formation, with final fusing of the spurs in the formation of a web. Of the supraglottic webs, the writer has encountered three following laryngo-fissure operations, and has seen one subglottic web develop following laryngostomy with the fistula still open and after the laryngeal wound had dermatized.

The most frequent location, however, of these stenotic webs is in the region of the cricoid cartilage well below the vocal cords. Some of these may be termed tracheal webs, for many of them involve the upper tracheal rings as well. These webs are frequently imperforate when of long duration, especially in chronic tracheal cannula cases, when tracheotomy has been performed in the attempt to dispense with the intubation tube in post-diphtheritic laryngeal stenosis. The writer can recall five instances of imperforate web stenosis in the region of the cricoid cartilage which was the sole cause of the inability to permanently decannulate the patient. It is surprising to see the marked arytenoid motion with such complete stenosis above the cannula. These webs were incised tracheoscopically and bouginaged. Again, the web in this locality may have a very small lumen for laryngeal respiration, not sufficient for air to pass freely through the larynx and render decannulation difficult. The small lumen of the web at times may present a dimpled appearance. They may be thick and pyramidal at the base attachment to the laryngeal wall, and extremely thin in the central portion. This in a measure accounts for the ease of incision and bouginage to keep the lumen open. So far no web even with the small millimeter lumen for laryngeal respiration has had any tendency to increase its diameter without divulsion by mechanical measures, and any attempted re-education to laryngeal respiration with the tracheal cannula partially occluded has not proven successful in my hands. It is surprising to see in cases with only one millimeter lumen for laryngeal respiration above the cannula

that the vocal cords are quite normal. These children also possess remarkably good voices, provided the cord is not fixed in a subglottic cicatrix. If such be the case the voice will immediately return as soon as the subglottic cicatrix is severed. Arytenoid motion is always good in these cases even when there is complete imperforate web stenosis allowing no air to enter the larynx. This free arytenoid motion has been noted frequently by the writer to occur on the introduction of the laryngeal spatula, and it is caused by the gagging and swallowing efforts due to the presence of the speculum. This motion is probably kept up constantly by the acts of deglutition.

In some of the cases the larynx is apparently fused together, and when the lumen of the tracheal cannula is temporarily closed by the finger of an assistant no opening into the larynx can be seen, and the cords are not visible. However, there is good arytenoid motion seen through the speculum.

On the introduction of a small bougie in such cases, the fused cords can be gently separated, and a small dark spot will be seen just below the cords which is the imperforate subglottic cicatrix. As soon as the web is severed; which in some instances may be accomplished very satisfactorily with a small bougie, the patient will utter a loud cry much to the surprise of himself as well as the operator and bystanders. When the web is gradually bouginaged and the diameter of the lumen increased, these children will have good voices, and be able to breathe through the larynx without the lumen of the tracheal cannula being closed. This is accomplished by using small under-size cannula in every instance, and obviates the necessity of plugging a large lumen cannula. Plugging the tracheal cannula for re-education to mouth respiration does not prove satisfactory when a cicatricial web is the cause of the stenosis above the cannula. The lumen of the web does not increase its diameter, for very little air will pass through a millimeter lumen.

The treatment of cicatricial web stenosis is by endolaryngeal and retrograde bouginage, and by repeated applications of the galvanocautery. If the cricoid web stenosis is thick and of the imperforate type, the web may be severed with the knife, the cutting edge being turned in the anterior direction. If the web is of the thin imperforate, or dimpled variety in its central portion, gentle pressure with a small bougie will open it in a satisfactory manner.

The tip of the bougie should always be directed ventrally to avoid a false passage into the esophagus. As soon as the web is incised by the laryngeal knife or galvano-cautery, a small intubation tube or soft rubber laryngeal tube should be introduced to keep the edges from fusing, or else the stenosis may recur in the line of incision. This is only necessary, however, when one is dealing with an imperforate web stenosis. When the web has a lumen of from one to two millimeters in diameter; it should be gradually dilated by bougies until the lumen is of sufficient size to admit the galvano-cautery knife. Then the web is easily severed, and further bouginage keeps the lumen well open. The thick pyramidal base attachment of the web is gradually reduced by repeated applications of the galvano-cautery.

The lumen of a web has no tendency to close once bouginage has been started, and the diameter of the lumen usually remains the same size of the last bougie introduced. The lumen has no tendency to increase its diameter without mechanical divulsion from time to time. Bouginage and galvano-cauterization are performed once a week.

In cases suffering from complete cicatricial web stenosis with fusing of the cords, bouginage performed with great care will open the larynx, and then the introduction of the writer's soft rubber laryngeal tube will keep the lumen open. Once the lumen has been opened after dilatation with the soft rubber tube, repeated applications of the cautery and continued bouginage are necessary to increase the diameter and reduce the thickened peripheral edges of the web.

The same method of treatment has been employed in the treatment of tracheal stenosis. Great care should always be taken when introducing a bougie into the tracheal fistula. The top of the bougie should be directed ventrally, and the anterior lip of the tracheal fistula raised. The tracheal fistula should be studied with a short tracheoscope before bouginage is attempted. By following out this method of introduction of the tip of the bougie, and by gentle manipulation the bougie can be readily introduced. Spur formations, polypoid granulations and all fungating tissue in the tracheal fistula are removed by tracheal curettage after dilatation has been accomplished. With great care retrograde cauterization can be accomplished tracheoscopically in the same manner as when dealing with laryngeal webs.

Case 1: J. A., a young woman twenty-five years of age was referred by Dr. Archibald Dickson of the Willard Parker Hospital for treatment. On admission to the hospital the patient was breathing with much difficulty, and there was a whistling sound audible at some distance, both on inspiration and expiration. The whistling respiration simulated tubal breathing through a small tracheal cannula. Her neck was examined but no tracheotomy tube was present, and the whistling noise was produced by a stenotic laryngeal web which had only a very small lumen for respiration. The neck was a mass of scar tissue, a thyrotomy having been performed at the Manhattan Eye and Ear Infirmary at the

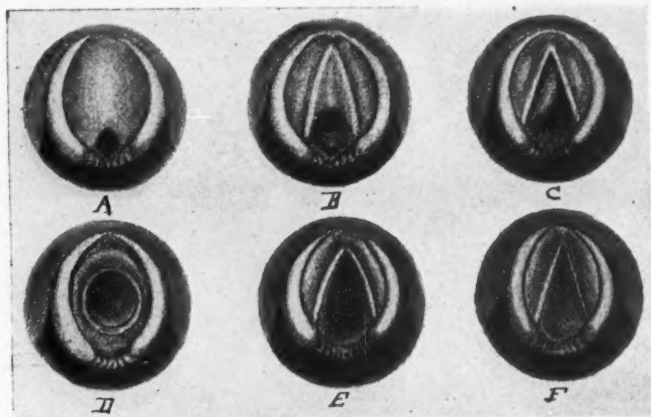


Fig. 1.

age of five years for the relief of post-diphtheritic laryngeal stenosis and the retention of an intubation tube. The operation was successful after the wound had closed over the intubation tube, and the patient was able to remain without the tube, but never had a voice. How much dyspnea she had following the removal of the tube it is impossible to state definitely, for the old case histories of the Manhattan Eye and Ear Hospital were not accessible.

An attempted laryngeal examination was made with a mirror, but as the patient was so dyspneic a satisfactory view was impossible. Low tracheotomy was performed under local novocain anesthesia and the larynx examined by direct inspection three days later.

There was a complete cicatricial stenotic web which stretched across the laryngeal aperture. (Fig. 1, A.) The vocal cords were not visible, and there was only a small opening in the web between the arytenoid eminences for respiration. The web was incised and the larynx bouginaged a few days later. After dilatation the author's soft rubber laryngeal tube was introduced to keep the lumen open. (Fig. 1, D.)

The patient is still under treatment. There is no motion of the arytenoid joints and no return of voice after the removal of the tube. However, the laryngeal lumen has increased in diameter.

Case 2: C. O., a boy of four years of age was admitted to Kingston Avenue Hospital for what was supposed to be laryngeal

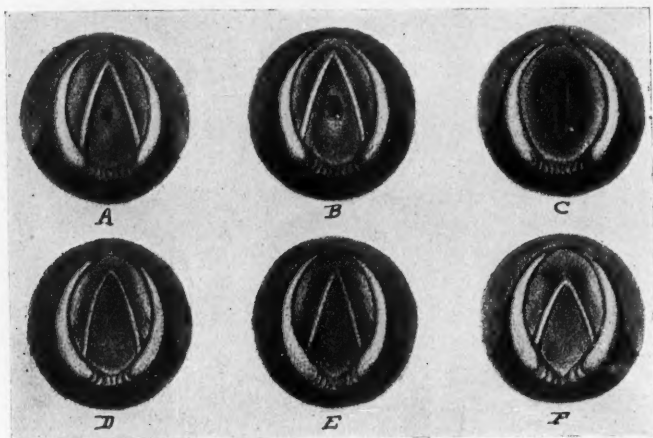


Fig. 2.

diphtheria. The child was isolated on admission by Dr. Raymond Laub, who called me to make a direct laryngeal examination for there was a history of laryngeal papilloma having been removed at a hospital in Brooklyn two years before.

The boy while dyspneic had a fairly good voice. The dyspnea was both inspiratory and expiratory, but the greatest difficulty was with inspiration. There was an old tracheal scar in the neck.

The direct laryngeal examination revealed a vocal cord web which involved the anterior two-thirds. (Fig. 1, B.) The web was loose and was sucked in on inspiration. The child was able to cry, for there was good arytenoid motion, and the shortened

vocal cords approximated to produce the voice. Tracheotomy was performed in the line of the old scar, great care being taken to locate the original opening into the trachea. The primary incision should always be open when performing secondary tracheotomy, or else a sloughing cartilage island may be the result and cause difficult tracheal stenosis.

The web was gradually incised by galvano-cauterization and the vocal cords lengthened. (Fig. 1, E.) The boy made a complete recovery, and there was no recurrence of the web after one year.

Case 3: Z. B., a girl of two and a half years, was referred by

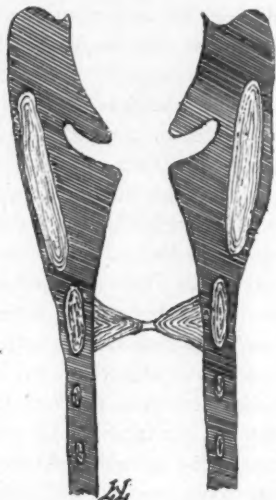


Fig. 3.

Dr. S. J. Keefe, of Elizabeth, N. J. The child had been intubated for laryngeal diphtheria by Dr. Keefe, and owing to persistent subglottic edema detubation was impossible. Dr. Keefe then performed tracheotomy and detubated the child. For two months the child breathed fairly well through the larynx, but it was impossible for her to breathe with the cannula occluded, or even with an undersize cannula. The child had a fairly good voice and was able to cry, but there was difficulty both with inspiration and expiration. After having worn a tracheal cannula for over one year, Dr. Keefe kindly referred her to the writer for treatment.

The larynx was in good condition, the vocal cords were normal, and there was good motion of the arytenoid cartilages. Below the cords was seen a cicatricial bulging which looked not unlike a marked subglottic edema bulging from the left lateral wall. (Fig. 1, C.) A five mm. tracheoscope was introduced through the speculum to get a better view of the bulging in the subglottic region. The stenosis was now recognized as a dense cicatricial subglottic band or web partially obstructing the laryngeal lumen. The web was incised by the galvano-cautery knife, and a short rubber intubation tube introduced to keep the lumen open. This tube was left in for one week when it was removed and a second application of the cautery made. The treatment was continued at weekly intervals until the web had disappeared. The child was decannulated after six months' treatment and has remained well ever since. There has been no recurrence of the web or cicatricial band after a period of two years. (Fig. 1, F.)

Case 4: H. J., a child of two years was referred by Dr. Angelo Smith, of Yonkers, N. Y., for decannulation. The child had been intubated by Dr. Roberto for laryngeal diphtheria, but as the child persistently coughed-up the tube he called Dr. Smith who performed tracheotomy. The child breathed fairly well through the larynx for the first month but shortly after laryngeal respiration became difficult and no air would enter the larynx.

On direct inspection the vocal cords were apparently in good condition but reddened, there was good arytenoid motion even with no air passing through the larynx. This was caused by gagging due to the presence of the speculum. Deep down in the region of the cricoid cartilage could be seen a cicatricial web. With a 4 mm. tracheoscope the web was studied. The web was imperforate with a small dark spot in the central portion which in closing had completely shut off all air from entering the larynx. The central closure was apparently thin and presented the appearance of a dimple. (Fig. 2, A.)

With a small bougie the dark spot was opened and air immediately entered the larynx and the child was able to cry. The lumen was gradually increased in diameter by endoscopic bouginage until it was sufficiently opened to admit a 5 mm. soft rubber laryngeal tube. Then bouginage was started from below and the soft rubber laryngeal tube introduced. This treatment has been continued for nine months, and at the present time there is no

web present and the child is able to breathe well through the larynx with the lumen of the tracheal cannula open. A 4 mm. lumen cannula has been used, and the child has had no difficulty in breathing through the larynx since the laryngeal web obstruction has been removed. (Fig. 2, D.) The small undersize tracheal cannula gives much more room for air to pass freely by the cannula into the larynx.

Case 5: G. S., a boy of four and a half years, was referred by Dr. Fred N. Sperry, of New Haven, Conn., for decannulation. The boy had been admitted to the New Haven Hospital on October 22, 1918, for laryngeal diphtheria and intubated shortly thereafter. The tube was coughed up five days later and the boy remained without the tube and was discharged from the hospital ten days later. The boy had no difficulty in breathing on the day of his discharge from the hospital, but he returned three days later. The dyspnea now became gradually progressive, and there was marked inspiratory and expiratory difficulty. Dr. H. S. Reynolds made a very thorough physical examination and found the heart and lungs negative. The respiratory sounds were equal on both sides of the chest in spite of the marked retraction. Re-intubation was not attempted and a low tracheotomy was performed by Dr. Sperry. The tracheal tube became dislodged two days later, and a longer tube was introduced. There was some reaction following the tracheotomy, but the temperature fell to normal a few days later. Attempts were made to plug the tube and make the child breathe through the larynx, but this was unsuccessful and the child would become cyanotic. Similar attempts with the tube removed were equally unsuccessful. A radiographic plate taken at this time showed no thymus enlargement. The foregoing is a brief abstract taken from the case history of the patient while in the New Haven Hospital, which was kindly forwarded to the writer by Dr. Sperry.

On April 14, 1919, the boy was admitted to the Willard Parker Hospital. Cultures taken from the tracheal tube showed *K. L. bacilli*.

A direct laryngeal examination showed a good pair of vocal cords with a slightly shortened anterior commissure. There was good arytenoid motion. Deeply located below the cords in the region of the cricoid cartilage could be seen a cicatricial web with a small central lumen of about two millimeters in diameter. (Fig.

2, B.) This web was further studied with a 5 mm. tracheoscope to get a closer view. The web was bouginaged and the lumen gradually increased. At first it was extremely difficult to insert the smallest bougie through the opening in the web, but after seven treatments an eighteen to twenty mm. bougie was readily introduced. There still remained, however, the thickened peripheral edges of the web, and these were gradually cauterized until they have disappeared. The laryngeal lumen is well open, and the boy can breathe normally through his larynx without the lumen of the tracheal cannula being closed. He has worn an undersize tracheal cannula since admission and has been re-educated to mouth respiration while the lumen is wide open. There is no dyspnea and the boy will be decannulated shortly. (Fig. 2, E.)

Case 6: M. S., a boy two and half years of age, was referred by Dr. Sperry for decannulation. The following is a brief abstract of the case history forwarded to the writer by Dr. Sperry.

The patient was admitted to the New Haven Hospital, October 6, 1918, with marked stridor and retraction and was immediately intubated. The boy was suffering from a severe type of laryngeal diphtheria, having been ill five days prior to admission. A dose of 20,000 units of antitoxin was administered. A thorough physical examination was made by Dr. Tileston after the child was intubated. Aside from noisy respiration due to the presence of the tube, no bronchial obstruction or pulmonary involvement were elicited. The tube was coughed up on the fifth day and re-intubation was necessary in one hour. There were now a series of extubations and auto-extubations to November 11th, when the tube was coughed up as fast as it was replaced. On this day it was necessary to perform an emergency tracheotomy to save the life of the patient. A note by Dr. Denning says: "The patient was practically dead after auto-extubation of the tube. Emergency tracheotomy was performed and artificial respiration restored the patient. Since tracheotomy there has been no noteworthy change in the patient's condition. He has gained in weight, and the temperature remains normal. Attempts at blocking the opening of the tube, or at plugging the wound when the tube is removed, result in the patient becoming much frightened and cyanotic. Removal of the tube without plugging the wound has the same effect."

On April 14, 1919, the patient was admitted to the Willard Parker Hospital, as cultures from his tracheal tube also showed *K. L. bacilli*.

Direct laryngeal examination showed complete closure of the larynx with apparent fusing of the cords. (Fig. 2, C.) However, there was good arytenoid motion due to gagging on the introduction of the speculum. With a small olive pointed bougie the fused cords were gently separated, but the bougie would not pass through the larynx. One week later a second attempt was made after the cords were separated but this was also unsuccessful. The tip of the bougie would enter the larynx for about one centimeter. At this examination a dark area was noted below the separated cords which was an imperforate web cicatrix. At the third trial one week later the small bougie passed through the larynx, and as the lumen opened the child uttered a loud cry. Bouginage was continued at weekly intervals until a 16 mm. size could be passed with ease. Then retrograde bouginage was started and the larynx and trachea were dilated. A five mm. soft rubber laryngeal tube was introduced to keep the lumen open and an undersize tracheal cannula introduced. The rubber laryngeal tube was worn for four weeks with a change once a week for cleansing and further bougie dilatations. After four weeks the soft rubber laryngeal tube was removed for a test for laryngeal respiration without the tube. The child was able to breathe fairly well through the larynx with the lumen of the undersize tracheal cannula open. He still continues to breathe through the larynx and the cicatricial web has disappeared. However, the vocal cords are shortened anteriorly. (Fig. 2, F.) He has not been decannulated for he has just recovered from a severe attack of measles and broncho-pneumonia. These unfortunate crossed infections occurring at times in the writer's chronic laryngeal cases have frequently put an end to what promised to be a successful outcome.

DESCRIPTION OF ILLUSTRATIONS.

Fig. 1—(A) Direct laryngeal view of a supraglottic cicatricial web stenosis following thyrotomy which was performed twenty years before for post-diphtheric laryngeal stenosis. There is only a small opening for respiration between the two arytenoid eminences. (B) Direct view of a vocal cord or "glottic" web stenosis following the removal of multiple papilloma from the larynx. Good arytenoid motion was present, and the child had a fairly good voice when the shortened vocal cords approxi-

mated. (C) A cicatricial subglottic web or band attached to the left lateral wall of the larynx causing obstruction and making decannulation difficult. The vocal cords were normal, and the child though dyspneic had a good voice. (D) A view of the larynx in the same patient A, after the introduction of the author's soft rubber laryngeal tube to prevent recurrence of the web. The patient has no arytenoid motion, and has only a whisper voice on removal of the tube. (E) A direct view of the larynx of B, after severing of the glottic web. The larynx has returned to normal and there is a good speaking voice. (F) The appearance of the larynx of C, after the removal of the cicatricial band. The child has a good voice and breathes freely through the larynx. There is no recurrence after two years.

Fig. 2—(A) Laryngeal view of an imperforate dimpled web stenosis at the cricoid level. The dimpled central lumen must have recently closed, for it was extremely thin and easily opened. The child was able to breathe through the larynx for one month after tracheotomy, but this gradually ceased with the closure of the central lumen. (B) A cricoid stenotic web with a central lumen of two millimeters for laryngeal respiration. The vocal cords are normal, and there was good arytenoid motion. (C) A direct laryngeal view of a complete closure of the larynx due to an imperforate cricoid web stenosis of five months duration. There was good arytenoid motion seen through the speculum while the child was gagging. The fused cords were gently separated and a cicatricial cricoid web was visible below the cords. The child uttered a loud cry as soon as the web was severed sufficiently to allow air to pass through the larynx. (D) The laryngeal picture of the same patient as seen in A after bouginage treatment. The child has a good voice and normal respiration. (E) The larynx of B, after the disappearance of the cicatricial web. The vocal cords are normal, and the child has a good voice and no dyspnea. (F) A laryngeal view of C, after laryngeal bouginage and the introduction of the soft rubber laryngeal tube. The child has a good voice and easy respiration.

Fig. 3—Schematic illustration of a longitudinal section of the larynx and trachea showing the thick pyramidal base attachment of a cricoid cicatricial web. The dotted line bridged across from the apices of the pyramids on either side, represents the complete fusing in the production of an imperforate cricoid web.

127 West 58th St.

**EXOPHTHALMOS AND THIRD NERVE PALSY DUE TO
ACUTE EMPYEMA OF THE POSTERIOR ETHMOI-
DAL SINUS—CURED BY INTRANASAL OPER-
ATION.***

DR. DERRICK T. VAIL, Cincinnati, Ohio.

The patient, G. H. B., male, age 50, occupation bookkeeper, was referred to me by his family physician, November 24, 1919.

History: Ten days before I saw him there set in a burning pain around his right eye and deep in the orbit. Within twenty-four hours his right upper eyelid fell down and the eye turned outward. The vision seemed unaffected. Denies syphilis.

Examination. There was some exophthalmos, complete ptosis, 20° divergence and partial mydriasis of the pupil, right eye. The motility was sluggish, the pupil responded feebly to light and effort of accommodation. Tension of the eyeball normal, ophthalmoscopic examination negative. Field of vision normal. Vision 20-40 becoming 20-20 with +0.50 D. Sph. lens.

Diagnosis. Paralysis of the third nerve (right side). Patient sent to hematologist for Wassermann test which was returned negative. The next day (November 25th) X-ray examination was made by Dr. Lange and the report came that there was complete clouding of right frontal, right ethmoidal and right antrum regions. Left sinuses negative.

Examination of the nose. The middle and inferior turbinated bodies were acutely hypertrophied. Left nares normal. There was a trail of mucopurulent secretion on the posterior wall of the pharynx on the right side evidently coming from his right posterior ethmoid.

Diagnosis changed to sub-periosteal abscess of the right orbit at the apex from pansinusitis right side.

The appearance of the patient at this time is shown in the accompanying photograph taken November 28, four days after he came to see me or two weeks after his first symptom.

Patient was then referred to my partner, Dr. F. W. Lamb, for intranasal surgery designed to drain the abscess.

*This case was demonstrated at the Middle Section of the American Laryngological, Rhinological and Otological Society at Cincinnati, February 20, 1920.

Dr. Lamb used suction treatment until December 17, succeeding at each treatment in drawing out a large amount of yellow pus from the sphenoidal region in the nasal attic. After each treatment the patient experienced relief, but finally (December 17) Lamb performed exenteration of the right ethmoid labyrinth dropping into an enormous posterior ethmoidal sinus which was full of yellow pus. The nasal wall of the ethmoid bone was much softened so that it was easy to enter the structure of the bone. From this time on the recovery was very prompt. The upper lid began to show power within three days after the operation and in ten days had regained normal power. The eye became straight and worked harmoniously with its fellow. The exophthalmos entirely disappeared and, in short, recovery was complete.



Interpretation: There was probably a sub-periosteal abscess of the orbit which had broken through the orbital wall from the posterior ethmoid sinus and which fortunately did not rupture through the periosteum to produce orbital abscess. There was some drainage in the nose established by nature from the abscess cavity. In other words it was not a locked up abscess. The optic disc was normal in appearance because the abscess did not interfere with the blood vessels entering the nerve as it was located too far back.

ACUTE MIDDLE EAR INFECTIONS IN CHILDREN; FROM THE STANDPOINT OF THE PEDIATRIST.

DR. LINNAEUS E. LA FETRA, New York City.

Among infants and children acute ear infections take rank in number and importance only second to respiratory and gastro-intestinal disturbances. They are a common occurrence in affections of the upper respiratory tract and prove frequently formidable complications in scarlet fever and measles. In private practice among children, hardly a day passes during the winter season without one's coming across an acute ear inflammation, and in hospital practice it is not an uncommon thing to have to incise two or three drums daily in the infants' wards during the season of respiratory infections. Being acquainted with this susceptibility to ear infections, the pediatricist is always on the lookout for ear inflammation, and consequently is apt to see their development from an earlier stage than does the otologist. Routine examination will frequently reveal the ear inflammation before the baby has shown any manifestations referable to the ear by the mother or the nurse.

As to symptoms, complaint of pain in the ear, if present, is of course important, but young infants do not well localize their pains, and frequently a baby will cry and put his hand on the abdomen, complaining of pain there when examination will reveal a bulging drum as the cause of the pain. Rolling the head or putting the hand to the ear are suggestive, but often they have no significance. Absence of any complaint of pain or even of general restlessness is no proof that the ear is not inflamed. Temperature elevation is nearly always present, but this also, like pain, may be absent even when the drum is bulging. Tenderness in front of the ear is a very reliable sign, but this, too, is occasionally lacking even when there is high temperature and bulging of the drum. Stiffness of the neck is occasionally present even without enlarged lymph nodes under the mastoid muscle and without mastoiditis. To sum up the indications of middle ear disease, a bulging drum is the only diagnostic sign. On examination, retraction of the drum and in addition some redness is frequently the first sign of

inflammation in the rhino-pharynx and often confirms a suspicion of acute rhinitis as cause for fever up to 102° or 103° when there is as yet no running or stuffiness of the nose. The next sign of ear involvement is some redness along the malleus, and the next some fullness and redness of Shrapnel's membrane. These signs are present so commonly with head colds in children and subside so readily that this small degree of otitis can be considered a very common accompaniment of acute rhinitis.

The next signs that appear mean an otitis-media, namely redness and bulging of the drum membrane, first behind and later in front. Occasionally the drum looks only gray due to thickened epithelium which must be removed to get a view of the drum itself. The retraction meanwhile increases and the appearance of the drum is that of a small thick red ring or doughnut. When accompanied by a high temperature these signs are sufficient justification for incision of the drum, but by far the large number of such cases will subside in a day or so if the nostrils are treated by a weak adrenalin solution, and hot irrigations of the ear are employed. I find that most otologists incise such drums, and the practice is undoubtedly a good one, for such an ear will frequently return to normal more quickly after being incised than if not opened. I have seen this in many cases when both ears became inflamed successively and in which the first one was incised. I appreciate fully the dangers of fulminating mastoid and am aware that the knowledge and experience of such cases is the reason why the otologist practically always makes an incision when he sees a bulging drum. And yet the making of an open wound with the dangers of additional infection from the outside has seemed to me a procedure to be avoided, if possible without risk to the child. The infrequency of mastoid complications and the very satisfactory results of conservative treatment are my justification for waiting further indications than those of the day of onset. If the tenderness elicited by pressure upon the tragus increases, if there is tenderness of the tip of the mastoid, if the temperature remains high after twenty-four hours and the bulging persists, incision is necessary.

The paracentesis should be done under chloroform anesthesia, though an exception may be made to this rule if the patient is an infant and only one drum is to be incised. The incision should be a "J" or "U" shape and should be carried well upwards. Irriga-

tion with hot boric solution immediately after incision is of advantage and it is always satisfactory to hear the child gulp or swallow during this irrigation, as this shows a free opening through the drum, with passage of the irrigation fluid into the throat. The temperature, the pain, the tenderness in front of the tragus, and the tenderness of the tip of the mastoid—if that has been present—should all subside after two or three days. It is quite common, however, for the temperature to remain elevated until the discharge becomes purulent. This may take two or three days after the incision.

Mastoid involvement has been, in my experience, a very infrequent complication of middle ear disease; among infants in hospital practice not more than 1% and in private practice not more than 2%. There is, however, great variation in different years. For several years I saw not a single case in private practice and then a year or two in which I saw six or eight, then a number of years with only one or two cases. The rarity of mastoid complications in infants' wards of hospitals is worthy of comment, not more than three or four occurring per year among hundreds of cases of acute otitis.

During the month of January, 1920, there were in the Children's Wards of Bellevue Hospital 248 admissions; 11 had primary otitis media and 31 had otitis secondary to other conditions, mostly of the respiratory tract. There were among these respiratory conditions 7 cases of broncho-pneumonia, 6 of bronchitis, 4 of acute pharyngitis and 2 of lobar pneumonia. During the year of 1919 there were only 2 cases of mastoiditis among 400 cases of otitis media. It is a common observation that in cases of bronchitis or broncho-pneumonia the complicating otitis media occurs usually from four to seven days after the onset of the primary disease. Often in cases of bronchitis the ear will become involved after the temperature of the acute bronchitis has subsided to normal. In these cases it is probable that the continued coughing of the early convalescent stage causes an infection of the Eustachian tubes.

The otitis that complicates measles is far more apt to result in mastoid than we have been taught to believe, and is almost as serious as the otitis complicating scarlet fever.

The chief reliable sign of mastoid inflammation is sagging of the posterior superior quadrant of the drum with the adjacent wall of the canal. Tenderness above the tip on a line directly behind

the meatus at the site of the mastoid emissary vein, and tenderness of the upper part of the mastoid in the region of the zygon are very important if they can be elicited. Other suggestive signs are a profuse discharge or the sudden cessation of a profuse discharge. In little babies, and occasionally in older children, edema over the mastoid process is important. It should be emphasized that vacillations of temperature without the canal signs are not reliable, though if these temperature elevations are continued and unexplained by pneumonia, by pyelitis or by gastro-intestinal disturbance, they must be regarded as pointing to mastoid involvement. Successive blood counts, if they show an increase in the number of polynuclear cells and in the total leucocyte count, are also valuable, but single blood counts are of little importance since the blood in children is so susceptible to a polynuclear and total leucocyte increase.

To my mind the indications for the mastoid operation are a persistence of the signs already mentioned, in spite of free drainage through wide incision in the drum. It is manifest that if the inflammation is not subsiding there must be increasing destruction of the mastoid cells and the only method of cure is by posterior drainage through the mastoid bone, together with clearing out of all the cells and bony tissues that are infected.

Sinus-thrombosis is so exceedingly rare in my experience that I can say very little about these signs. In several instances, however, this diagnosis has been suspected chiefly because of a marked septic type of the temperature curve. It cannot be emphasized too often that marked vacillation in the temperature is a most unsafe guide to either mastoid disease or to sinus thrombosis. The temperature in children is so readily changed by slight causes that there must be localized evidence in order to make a diagnosis. Particularly, one should be on the lookout for pneumonia, pyelitis, tonsillitis, inflammation of the lymph nodes in the neck, and gastro-intestinal disturbances. During epidemics of grip it may be impossible to find any local condition to explain the temperature variations, but without definite evidence of trouble in the mastoid or in the sinus as determined by positive blood cultures, such diagnosis should not be made. I show a chart of a baby, 19 months old, in whom sinus thrombosis was suspected but did not exist, and in another instance sinus thrombosis was thought to be present probably because of tenderness along the mastoid muscle. This tenderness was an in-

flammatory reaction in the edge of the muscle extending down from the mastoid process which had been opened.

Of acute labyrinthine disease complicating mastoiditis I have seen only one case; it is, of course, very rare.

I have said nothing with regard to operations of mastoid and sinus, because they belong distinctly to the realm of the otologist. My plea to the general practitioner and to the pediatricist with regard to ear infections in children is that careful routine examination of the ears be made in all cases where fever is present. It cannot be emphasized too often that to the man who treats children, the otoscope is far more necessary than the stethoscope.

113 E. 61st St.

ACUTE MIDDLE EAR INFECTIONS IN CHILDREN FROM THE STANDPOINT OF THE OTOLOGIST.

DR. T. L. SAUNDERS, New York City.

The pediatrician and the otologist have one common aim: the prevention of middle ear infection in children. When this desideratum is not obtained their one desire is to restore the patient to his normal state with as little wear and tear upon the auditory apparatus as is possible.

The pediatrician is called upon to treat the acute infections in their early stages, and the otologist as a rule is called upon when operative interference of some sort is necessary. It is not my intention to burden you with a detailed account of the indications for incision of the drum membrane or the mastoid operation, but rather to put before you in a general and very informal way some of the personal impressions and opinions that I have formed after several years devoted to the practice of otology in New York City.

The longer I practice, and have noted the increasing severity of the respiratory infections in children, the more am I impressed as to the advisability of an early incision of an acutely inflamed drum membrane in children. While many cases will undoubtedly subside without this procedure, I think that a properly performed incision of the drum hastens a resolution of the inflammatory process and in many cases with far less damage to the auditory apparatus.

It should be our aim not only to cure the patients but to leave them with an ear which will not give catarrhal trouble in adult life. I believe that many cases of chronic catarrhal otitis media in middle age have their beginning in the oft repeated attacks of acute catarrhal otitis in childhood. I would rather have a healed incision of the membrana tympani than a thickened muco-periosteal lining of the middle ear cavity.

As to the question of irrigation following an incision I think that every case must be decided upon its individual merits. However, I do believe that in any case of acute otitis that is being irritated, and in which there is any question whatsoever of mastoid involvement, it is the duty of the medical attendant to irrigate the case himself once daily, or at least to inspect the ear after irrigation by the nurse or parent that he may see that this procedure has been properly performed. Furthermore I have been impressed with the necessity of keeping these patients in bed until the otitis has subsided. Children are prone to over do, and to get over tired. Rest in bed is a most important measure in conserving the resistance of the patient.

I am not in favor of the removal of tonsils or adenoids during an attack of acute otitis, in certain cases, however, where the attack hangs on and the persistent discharge is evidently due to an irritated or occluded Eustachian tube, re-incision of the drum membrane, together with removal of the tonsils and adenoids may be necessary to effect a cure.

To remove the tonsils and adenoids in an acute case where the possibility of mastoid involvement has not been excluded not only complicates the diagnostic problem, but makes too great a drain upon the resistance of the patient. On the other hand we, all of us, have seen post-operative cases in which the mastoid wound refused to heal until these offending members have been removed.

The uncomplicated case of mastoid involvement in childhood as a rule offers little difficulty either as to its diagnosis or treatment. In the complicated cases the pediatrician and the otologist must walk hand in hand, each is dependent upon the diagnostic findings of the other. "To operate or not to operate that is the question." It should be remembered that roughly about seventy per cent of all the cases of acute otitis, with mastoid symptoms, recover without the mastoid operation. It is a question that requires in the highest degree, common sense, surgical judgment and diagnostic ability.

The mastoid operation should not be considered lightly and should not be advised with the same freedom as is a paracentesis of the drum, neither should it be delayed until irreparable damage has been done to the organ of hearing.

There is no better test of an otologist than the way in which he handles this question of an operation. It might be well to remind the younger members of the section that aside from all ethical motives it is good business to save a patient from an unnecessary operation. A patient saved from a mastoid, results in perpetual gratitude on the part of the parents. If the mastoid operation is once performed a perfect result is taken as a matter of course, and any untoward result, eventuates in criticism of the operator.

It is impossible to discuss fully this important question; but I desire to briefly mention the significance of high temperature and running ears. The otologist is often called upon for an opinion as to whether the ears are the cause of the temperature. The difficulty usually comes in excluding the rest of the body as an etiological factor, and I know that the prevlous essayist will forgive me if I say that formerly there was a tendency to pin everything on the poor old otologist.

A common type of case seen in consultation is as follows: A child is suffering from an infection of the entire upper respiratory tract, the ears are involved at onset and have been incised. The temperature remains high or is still rising. The ears are discharging freely, but there are no signs of mastoiditis.

Many mistakes have been made in advising operation, relying on the negative findings of the medical man without confirmatory evidence of mastoiditis in the aural examination.

The point I wish to establish is, that in certain cases, for a time at least, causes of high temperature in children cannot be ruled out by the physical examination alone. The pediatricist is less positive than in the past and I think today it is a generally recognized fact that negative findings based upon simple physical examination of the chest do not rule out a pneumonic process. I would hesitate to operate upon a child who had a high temperature and simple running ears, without other confirmatory signs of mastoid or intracranial involvement. The responsibility placed upon the otologist is a heavy one. An X-ray of the chest in these cases may disclose a central pneumonia which gives no physical signs, and the development of an efficient portable apparatus makes it a diagnostic aid which should not be neglected. I would therefore make a plea for the routine use of the X-ray in these cases of upper respiratory infection with high temperature, running ears and negative general findings. If this had been possible in the past many a child would have been saved from the mastoid operation.

120 East 61st St.

DEEP CERVICAL ABSCESS AND THROMBOSIS OF THE INTERNAL JUGULAR VEIN.*

DR. HARRIS P. MOSHER, Boston.

On my last service at the Massachusetts Charitable Eye and Ear Infirmary we had what was for us at that time of the year quite a run of cases of sinus thrombosis. One of the worst of these fell to me. There were the usual complications that accompany an extensively thrombosed sinus and vein. For four weeks the patient ran the most wickedly septic chart that I ever saw. It was the wonder of the service how one frail woman could survive so much sepsis. Literally this was one of the sickest patients that I ever had anything to do with who got well. I ended my service at the Infirmary and went on duty in the Throat Room of the Massachusetts General Hospital with the picture of this case still fresh in my mind. I had been at my new post but a short time when a request came from one of the medical services to see in consultation a case of general sepsis. The case can be summarized as follows: The patient was a young man of twenty-six. He had been in the hospital about a week with the symptoms of general septicæmia. Three weeks before he was sent to the hospital he had a retropharyngeal abscess which was opened by a throat man called in by the attending physician. I saw the case, therefore, in its fourth week. Examination of the throat showed a small retropharyngeal swelling on the right side. There was a little swelling of the neck and questionable tenderness about the middle of the anterior border of the sterno-mastoid muscle. There had been a number of chills, and the chart was violently septic, one excursion being from 107 to 94. The blood cultures had been twice negative. Swabs from the throat gave no growth. The retropharyngeal swelling was so slight that I did not reopen the abscess. This was poor judgment, because on the next day Dr. Greene saw the patient and found a considerable retropharyngeal swelling, incised it and evacuated a considerable quantity of pus. The next day I was on duty and saw the case a second time. The man was failing rapidly. He had begun to hiccup obstinately, and the swelling of the neck was increasing. This young man's chart was so like Sarah's—this

*Read at Newark, New Jersey, February 7, 1920, at the Meeting of the Eastern Section of the American Laryngological, Rhinological and Otolological Society.

was the name of the patient that I had in the Infirmary—she was with us so long that we called her by her first name—that the possibility of thrombosis of the internal jugular vein in his case was hurled at me. Dr. Greene's incision had disposed of the last of the retropharyngeal abscess. The pus was focussing in the neck. My advice was not to let the patient die without exploring the neck for pus and uncovering the internal jugular vein for possible thrombosis. This view was agreed to and everything was made ready for a quick operation. A liberal incision was made over the anterior border of the sterno-mastoid muscle and carried promptly to the carotid sheath. The artery presented within the sheath but not the vein. On working outward about half an inch and a little backward the blunt dissector fell into a large abscess cavity and evacuated fully four ounces of the foulest kind of pus. As soon as this had been drained a systematic search was made for the vein. The carotid and the pneumogastric nerve were laid bare for some two inches. The vein could not be recognized. Over the nerve there was a thickened strip of tissue indistinguishable from thrombosed vein or thickened vessel sheath. At this point in the operation the patient stopped breathing. The routine measures usually employed in such emergencies were without success. After the patient's death a thorough exploration of the wound failed to identify the vein. An inch of the thickened tissue which lay over the nerve was excised. Later the pathological report stated that this was probably disorganized and thrombosed vein. No autopsy was allowed.

At the time I had no knowledge of a similar case. A provisional diagnosis was made of thrombosis of the internal jugular vein secondary to retropharyngeal abscess. The chief purpose of the operation was to find out the condition of the vein. A brief report of the case was published in *THE LARYNGOSCOPE* for November, 1919, hoping to establish priority. Now-a-days priority in medicine or surgery is an elusive thing. Had the war not prevented me from reading my current medical journals for some two years, I would have seen the report of a similar case by Goldman in the *Annals of Otology, Rhinology and Laryngology* for June, 1917. His case, therefore, is much earlier than mine. Even yet I have not had the opportunity to look up the bibliography which is appended to his article in order to see whether or not some of the men mentioned there antedated him. My interest in the question of the priority thus came to a sudden and violent end. The more I have thought

over the case, however, the more I have felt that it opens up a field new to many of us. It gives us as specialists a diagnosis new as yet, and enlarges the usefulness of an old operation. It explains some obscure cases which have happened in the past. It throws a new light upon the possible course of deep cervical abscess, and makes a fresh consideration of the subject timely. With my congratulation to the rightful owner of priority in this subject of primary thrombosis of the internal jugular vein, and it seems to lie between Goldman and Long, I will pass on the orderly development of the paper. It is divided into two parts: First a comparison of my case and the case of Goldman, and second a consideration of deep cervical abscess.

In Goldman's case the symptoms pointing to thrombosis began five days after an attack of acute tonsillitis. In mine the original infection was a retropharyngeal abscess. In both cases the temperature rose after a chill to 107. In both the blood cultures were sterile. In mine the swabs from the wound of operation were sterile. In both cases there was a swelling of the side of the neck, but in Goldman's case he found only induration about the vein, whereas in mine four ounces of very foul pus were evacuated. In Goldman's case the thrombosis of the vein was not extensive, occurring only at the junction of the facial vein. In my case, on the contrary, the vein was obliterated beyond recognition.

In Goldman's case the question rose as to whether or not the sinus should be exposed and obliterated. He decided against it, and the uneventful recovery of his patient proved that his judgment was good. I have thought quite a little of this point in connection with the possibility of other cases of this kind occurring in the future. It seems to me that if the thrombus extends high in the vein in the pharyngomaxillary fossa it would be wise, the condition of the patient warranting it, to expose and obliterate the sinus in order to minimize the danger of secondary hemorrhage into the fossa. I admit, however, that I am not altogether clear in my mind on this point. In Goldman's case the outcome was everything that could be desired. In mine it was a tragedy. I have asked myself many times and naturally have been asked by my friends why my patient died on the table. All the explanations that I can give are vague and unsatisfactory. As I said above no autopsy was allowed. The case primarily was one of retropharyngeal abscess, and such cases we all know often die most unaccountably. In connection with such happenings we speak of pressure on the vagus as

a cause, but as far as I know no one has ever settled the question. My patient did not seem to have respiratory embarrassment, but appeared rather to die of heart failure. This, I am aware, is only another vague explanation.

So much then for my case and the one of Goldman which antedates and practically parallels it. They both emphasize the fact that thrombosis of the internal jugular vein occurs as a so-called primary condition, and is not always secondary to thrombosis of the lateral sinus; in other words, is not always an extension of it. The discussion of the next part of the subject—deep cervical abscess—is best introduced by a review of the anatomy of the carotid sheath, and the pharyngomaxillary fossa. In connection with these two topics it is instructive to say a little about the deep cervical fascia and the lymphatic drainage of the neck.

The Pharyngomaxillary Fossa. The pharyngomaxillary fossa is roughly funnel shaped with the base up and the point down, and is of very considerable size. It is the pathway of the greatest nerves and vessels of the neck. It is the pathway also, of the vessels to and from the tonsil. The base of the funnel is the base of the skull. The point is opposite the lower limit of the angle of the jaw. The carotid sheath emerges at the point of the funnel, and for practical purposes, continues the fossa through the neck to the thorax.

The internal boundary of the fossa is the superior constrictor muscle. The external is the inner surface of the ascending ramus of the jaw, covered, of course, by the internal pterygoid muscle. Superiorly, the inner prolongation of the parotid gland makes a part of the external boundary. The upper cervical vertebrae covered by the prevertebral muscles, make the posterior. Zuckerkandl showed that it was divided by the styloid process and the muscles which spring from it into a large anterior chamber, which is in relation with the tonsil, and a smaller posterior chamber containing in its outer part the internal carotid artery, the internal jugular vein and the pneumogastric nerve. In the posterior chamber also, and near the median line, and on the body of the axis, there is a lymph node which drains the nose and the upper pharynx. It is this node which suppurates in retropharyngeal abscess.

In front of the styloid process and so in front of the great vessels, the inward prolongation of the parotid gland where it makes a part of the outer boundary of the pharyngomaxillary fossa has no sheath. On this account abscesses and tumors of the parotid

are unopposed in their spread toward the pharynx. Conversely, in retropharyngeal abscess or in cases where a peritonsillar abscess breaks through the superior constrictor into the fossa, there is often a swelling of the parotid and sometimes the pus evacuates through the gland.

The boundaries of the fossa show that it is open to infection from all sides. Tubercular abscess of the upper cervical vertebrae occasionally burst into it from behind; pus from a peritonsillar abscess at times breaks through the superior constrictor—the inner wall of the fossa; pus from a parotid abscess can enter the fossa from the outside; the carotid sheath can pour pus into it from below; and from above pus can come down along the jugular bulb. Pus also can reach the fossa from the internal surface of the mastoid process. Finally, the fossa can be infected from within by suppuration of the lymph node which is placed at the posterior internal angle on the body of the axis—that is by a retropharyngeal abscess which is the breaking down of this gland. From the standpoint of infection the most important structure in the pharyngomaxillary fossa is the internal vein. Like the fossa it is exposed to infection from all sides.

The pharyngomaxillary fossa can be approached through the mouth by piercing the superior constrictor to the outside of the anterior pillar of the tonsil—a splendid method of enucleating new growths of the tonsil and of the soft palate—and behind the posterior pillar. Externally the fossa can be reached behind the angle of the jaw or behind the upper border of the sterno-mastoid muscle. In both these incisions the styloid process is the guide to the great vessels. They lie at the same depth as the process and behind it. Dean prefers an incision in front of the sterno-mastoid muscle. This carries him to the inner side of the carotid sheath, and he continues backward into the prevertebral space between the carotid sheath and the side of the larynx. (The Proper Procedure for External Drainage of Retropharyngeal Abscess Secondary to Caries of the Vertebrae. L. W. Dean, *Annals of Otology, Rhinology and Laryngology*, June, 1919, p. 566.)

The Deep Cervical Fascia: As the carotid sheath is made from the deep cervical fascia, as certain layers of this are in relation to the pharyngomaxillary fossa, and as the surgical triangles of the neck are sealed in by layers of fascia and as the deep cervical fascia divides the neck into compartments a brief description of

the fascial sheaths is given at this point. Below the hyoid bone three of the deep cervical fascia layers are usually described.

The Superficial Layer. The superficial layer splits to enclose the sterno-mastoid and the trapezius muscles in a sheath. Above the hyoid bone it forms a sheath for the submaxillary gland and above this it is continuous with the parotid and masseteric fascia. It also makes the stylomaxillary ligament.

The Middle Layer. The middle layer is attached to the hyoid bone, covers the muscles above it which form the floor of the submaxillary triangle, and is attached to the mylohyoid ridge. Below the hyoid it forms a sheath for the depressors of the hyoid bone. It works its way downward as far as the pericardium and the sheath of the axillary vessels.

From the deep surface of the middle layer are given off expansions which make a sheath for the trachea, the thyroid and the great vessels of the neck.

The Deep or the Prevertebral Layer. The prevertebral layer covers the prevertebral muscles and is attached laterally to the cervical transverse processes, where it is continuous with the sheath of the scalenus anticus muscle and that of the brachial plexus. Inferiorly it is continuous with the sheath of the subclavian and the axillary vessels. It completes the carotid sheath posteriorly and makes the posterior boundary of the pharyngomaxillary fossa. It lies behind the esophagus and the pharynx.

The Fascial Compartments. The various layers of the deep cervical fascia divide the neck into four compartments. Between (first compartment) the superficial fascia and the superficial layer of the deep fascia, are the external jugular vein, the platysma and loose areolar tissue. Abscess here finds little difficulty in perforating the fascia above it and reaching the surface. Abscess between the superficial and the middle layer (second compartment) is prevented from descending into the mediastinum and axilla by the attachment of the middle layer to the sternum and the clavicle. Suppuration is more common here than elsewhere in the neck. This compartment contains the anterior jugular veins, loose connective tissue and lymphatic nodes.

Deep Cervical Abscess or Abscess in the Third Compartment. Abscess in the third compartment, that is between the middle and deep layers, cannot reach the surface without perforating the two overlying layers, and hence unless promptly evacuated tends to extend downward into the mediastinum or the axilla, depending for its course upon whether the abscess is situated mesially or laterally.

Mesial abscesses follow the loose tissue round the trachea and the esophagus. This compartment contains the great vessels of the neck as well as the chief lymph nodes. Early incision in deep abscess of the neck is imperative. Without it cases have been reported in which the pus has broken into the trachea or the esophagus or even into the pleura. Sarony reported a case in which a considerable part of the common carotid, a still larger part of the internal jugular vein, and a large part of the vagus nerve were destroyed. (Treves). Such cases depend upon the unyielding character of the cervical fascia.

Abscess in the Fourth Compartment. In the fourth compartment an abscess is known as prevertebral, or retropharyngeal if above the lower limit of the pharynx. It is important to remember that the third and the fourth compartments are continuous. The fourth compartment is called the prevertebral or retropharyngeal compartment. This space is really as has been pointed out before the pharyngomaxillary fossa and this fossa is continued into the neck by the carotid sheath. This conception of the fourth space makes the apparent dissimilarity of certain cases of deep abscess of the neck disappear. From the standpoint of practical surgery this conception of the third and fourth compartments as one unifies the whole subject of deep cervical abscess, and emphasizes one of its chief dangers—namely, thrombosis of the internal jugular vein.

The Lymphatic Nodes of the Neck. The lymphatic nodes of the head, that is, the nodes draining the face and the scalp, the orbit, the nose, the tongue, the mouth, the floor of the mouth and the pharynx, drain into the superficial and the deep cervical nodes.

The Superficial Cervical Nodes. The superficial cervical nodes lie along the external jugular vein between the platysma and the deep fascia, and receive lymphatics from the suboccipital, mastoid and submaxillary nodes, the ear and the surface of the neck. Those in the subclavian triangle communicate with the axillary nodes and hence may be enlarged in carcinoma of the breast. On account of their communication with the lymphatics of the esophagus the enlargement of the supra-clavicular glands may occur in cancer of the esophagus or the stomach.

The Deep Cervical Nodes. The deep cervical nodes lie on the internal jugular vein and within the third cervical compartment. They are arranged in an upper set above and about the bifurcation of the carotid, and a lower set. Directly or indirectly they receive all the lymphatics of the head and neck as the superficial set empties

into the deep set as well as all the other groups which do not drain wholly into the superficial set. At the base of the neck they communicate with the mediastinal, subclavian and axillary nodes. All the nodes of the deep set lie below the deep fascia. The deep nodes not only lie on the internal jugular vein but often are adherent to it.

Although in most cases the enlargement of the lymph nodes is caused by infection from the same side of the body, exceptionally the infection may come from the other side of the body. For instance, it has happened in carcinoma of one side of the tongue that the opposite submaxillary nodes were involved.

A number of cases which I have had in the past and a case or two of my colleagues have appeared to me in a new light since I had the case of thrombosis of the internal jugular vein which heads this paper. For example, I recall one case of sinus thrombosis which was accompanied by a persistent retropharyngeal abscess. It has just been shown how anatomically everything is favorable to such a happening. I recall also a case of Dr. J. H. Blodgett's. He had a retropharyngeal abscess as a complication of an acute mastoid—a kind of internal Betzold. Primary infection, as it is usually called, of the jugular bulb is a definite condition in infants and young children. Retropharyngeal abscess is likewise peculiar to infants and children. In retropharyngeal abscess the infection comes from the nose or the pharynx and causes the breaking down of the lymph node in the pharyngomaxillary fossa. In infants and children the pharyngomaxillary fossa is for some reason peculiarly liable to pick up infection. It is not unreasonable, therefore, to suspect that in primary bulb infection the infection also may come by way of the pharyngomaxillary fossa. It is a curious fact that in adults infection from the tonsil, or the nose, does not so readily reach the pharyngomaxillary fossa but stops in the neighborhood of the tonsil, giving peritonsillar abscess.

If we have primary thrombosis of the jugular vein from infection from the tonsils as in Goldman's case, there is no reason why we cannot have primary thrombosis of the jugular bulb from the same cause. Both are in relation to the tonsil by way of the pharyngomaxillary fossa.

I wish now to refer to a final case. I did not see it, but it was so tragic that knowledge of it was widespread. About four years ago a House Officer at the Massachusetts General Hospital developed a peritonsillar abscess. This was opened and did not refill.

The young man, however, failed to get well, and became generally septic and died. To my mind he had an early infection of the internal jugular vein with thrombosis. It was unrecognized and he died of it. The lesson of the case is clear in the light of the cases reported in this paper. It is that every case of peritonsillar or retropharyngeal abscess, active or quiescent, that has chills or shows a septic temperature probably has thrombosis of the internal jugular vein, and should be treated accordingly. Where there has been a previous throat infection which has cleared up, but the patient develops a swelling of the side of the neck with a septic temperature and chills the same condition prevails. Never let such patients die without uncovering the internal jugular vein and determining its condition.

The head is the chief gateway of infection for the body. It is simply another of nature's wise provisions that the lymphatic drainage from such frequently septic areas as the mouth, nose and pharynx should empty into a chain of lymph glands situated outside the great visceral cavities of the body. The very number of the cervical glands shows the volume of infection that they are supposed to combat. The success of the glandular collar is seen in every case of tonsillitis. In the cases in which the glands seem to fail in their mission, and break down, their failure is not absolute because they usually rob the pus of its virulence, and it remains only for the surgeon to evacuate it before it can cause disaster by pressure. In certain cases—(Goldman's, for instance, and my case)—the glandular protection was not adequate and we have primary or secondary infection of the internal jugular vein. We know how to deal with this condition. We should always be on the watch for it. A reasonable suspicion that the condition exists should lead to immediate action.

I cannot close this paper without quoting a paragraph on deep cervical abscess from Cheever's Lecture on Surgery. Dr. Cheever was one of the worthies of my medical school days. He was tall and spare and deliberate, and direct in speech and action. He radiated firmness and decision. He was the antithesis of the chatty, slap-you-on-the shoulder type of lecturer and man. We felt as his students, that we could not afford to miss a word he said. On page 487 of his surgery there is the following paragraph. I quote it entirely with some running comments of my own. "Quite as rare—he has been speaking of parotid abscess—and much more fatal, is the deep seated abscess of the neck, of which the hospital

see perhaps three to six cases a year, and a private physician, perhaps, not one in five or six years. It is a cellulitis followed by the formation of pus; acute; under the deep cervical fascia; usually somewhere about the sheath of the vessels near the sterno-mastoid muscle. Its symptoms are obscure. The patient has difficulty in swallowing, difficulty in breathing; the voice is affected, becomes hoarse. On looking into the mouth absolutely nothing is seen. The velum, and palate and tonsils and back of the pharynx, and probably all parts below are found free from irritation, except congestion of the vocal cords from pressure; but I am inclined to think the dyspnea produced is not due to pressure of the pus upon the parts about the larynx, because they are strongly protected by the box of the larynx, but by pressure on the inferior or superior laryngeal nerves. At the same time, from pressure on some fibres of the pneumogastric, difficulty of swallowing, and imperfect action of the constrictors of the pharynx follow. The patient does not show anything inside of the throat; but speedily there begins to show on one side of the neck brawny, indurated swelling, but generally no redness. There is inability to move the neck, and edema, together with marked and severe constitutional symptoms; chill, high temperature, sweats. (Here we have phlebitis or thrombosis of the internal jugular vein.—The writer.) This means pus in deep, beneath the deep cervical fascia. (It means more than this—it means thrombosis of the internal jugular vein.—The writer.) If diagnosticated and reached, the patient is almost always saved; if not, the cases are generally fatal; and this by running down into the mediastinum and pleura, or breaking into the back of the trachea, or by suffocation. It is an extremely serious affection, and the whole point consists in making an early diagnosis; and having made it, in pursuing the proper course, which is to seek the pus. (And if symptoms warrant it to determine the condition of the vein.—The writer.) We make the incision on the front or back of the sterno-mastoid muscle; the back is usually farther away from the pus. (See Dean "The Proper Procedure for External Drainage of Retropharyngeal Abscess Secondary to Caries of the Vertebrae," *Annals of Otology, Rhinology and Laryngology*, June, 1919, page 566.) He advises going in front of the sterno-mastoid muscle.—The writer. Then we take a director, and begin to bore carefully into the soft tissues of the neck; or we may get in the little finger. (We would now say lay bare the internal jugular vein.—The writer.) At first you may be quite disappointed.

Finally, far up behind the styloid process, you get a gush of pus. Enlarge the incision, insert a drainage tube, and wash out the whole cavity. (We would omit the washing today.) Usually a free opening on one side, with drainage and syringing, suffices to relieve the trouble. The relief is wonderful, the recovery is prompt. The patient generally gets well in a fortnight after the incision is made.

Conclusion. The vital structure in the neck from the standpoint of infection is the internal jugular vein. In deep cervical abscess the vein is always exposed to the danger of infection. In such cases where there occur chills or a septic temperature there is either a phlebitis or a thrombosis of the vein. Further, such symptoms in a case of abscess of the neck mean that the vein should be laid bare and its condition determined. If it shows phlebitis only the vein should be tied; if it is thrombosed, it should be dissected out. Pus about the internal jugular vein is analogous to pus in contact with the lateral sinus. More pus, of course, can accumulate about the vein either in the carotid sheath or in the pharyngomaxillary fossa, than about the sinus, as this is surrounded in part by bone. A deep cervical abscess should always be regarded as a perijugular abscess, and the vein should be exposed and dealt with according to the well known principles which guide the surgeon in dealing with a perisinus abscess. In the majority of cases of perisinus abscess, the evacuation of the pus is sufficient to save the sinus from infection. In a perijugular abscess the same thing is probably true. A perisinus abscess is watched knife in hand. This should be the rule in deep cervical abscess. At the first sign of a septic temperature, or with the first chill the vein should be tied or excised. The case should not be labelled septicemia and our surgery confined to the taking of blood cultures. This has happened in the past. It is strange that with the dramatic picture of sinus thrombosis before our eyes for so many years we should have failed to recognize a similar condition in the same vein lower down. We have always considered the infection of the lateral sinus or the internal jugular vein must come from the mastoid. Infection, however, can reach the vein from the tonsil just as readily as from the middle ear. It is another case of the obvious thing being the hardest to see.

Note. The paragraphs on the cervical, fascial and the the lymphatic drainage of the neck are quoted at length from Woolsey's Applied Anatomy.

OBSERVATIONS REGARDING THE TREATMENT OF BRAIN ABSCESS.*

DR. WILLIAM SHARPE, New York.

The treatment of brain abscess is a surgical one, but its diagnosis and accurate localization are usually so difficult that any operation of drainage must be considered as an exploratory procedure; not only is this true of multiple metastatic abscesses in the brain as a complication of purulent foci elsewhere in the body, but also those abscesses of the underlying brain due to the extension of infection by contiguity of a fracture of the skull, sinusitis or otitic disease. The great frequency of multiple abscess formations resulting from metastatic processes makes a most confusing clinical picture and the prognosis is always bad, whereas a solitary abscess of varying size is one of the complications of a local cranial infection. Fortunately in these latter patients, the subcortical abscess formation is frequently in close proximity to the primary infective focus whether it be an overlying fracture of the vault of the skull, an underlying sinusitis of the frontal, ethmoidal or sphenoidal bones or an ipsilateral otitic infection.

Unlike most brain tumors which produce an increase of the intracranial pressure by their added tissue formation or by a blockage of the ventricles, brain abscesses on the contrary replace brain tissue so that unless the escape of cerebrospinal fluid from the ventricles is blocked by a large subtentorial abscess formation, then there are produced no signs of a marked increase of the intracranial pressure and this absence of high intracranial pressure is of positive value in the diagnosis; a meningeal irritation, however, resulting from the proximity of the abscess formation to the cortex will frequently cause an increase of the intracranial pressure and this serious complication of a possible acute purulent meningitis must always be feared; frequent cytological examinations of the cerebrospinal fluid are most helpful.

In the surgical treatment of brain abscess complicating a fracture of the skull, sinusitis or otitic disease, it is essential to eliminate the original infective focus and then (and this is the most important point to decide in the treatment of brain abscess of whatever

*Read before the Otological Section, New York Academy of Medicine, December, 1919.

cranial origin), if we are absolutely certain that the abscess formation lies directly beneath the affected dura and that this area of the dura is adherent to the underlying cerebral cortex, then the ideal method of operative drainage is naturally through the site of original infection whether it be a fracture of the skull, a sinusitis of frontal or ethmoidal bones or an otitis media with mastoiditis; that is, first the local operation to remove the original infective process of the fracture of the vault, the frontal or ethmoidal sinuses and, in otitic disease in which we are chiefly interested this evening, the "cleaning out" of the mastoid cells and the exposure of the dura. The question now is, "Whether this exposed dura should be punctured by an exploratory needle through the infected area of the fracture of the vault, the sinus or the mastoid cells in the hope that the brain abscess lies in the cerebral cortex just beyond the dura?" I use the phrase "in the *hope* that the brain abscess lies just beyond the dura" advisedly, because in a large percentage of patients it is impossible to state with certainty that a cerebral abscess is present, and if present, then its accurate localization. It is for these two reasons that the diagnosis of brain abscess must, with few exceptions, be a tentative one, and the operation of drainage must in reality be an exploratory procedure owing to the great difficulty of accurate localization even when the abscess formation is present. (The extradural abscesses as well as the subdural but supracortical and therefore extracerebral abscess formations must not be confused with the true brain abscess—a cortical and usually, a subcortical formation). I repeat, if it is definitely known that the brain abscess lies in the cerebral tissues directly beneath the infected dura in which patients the dura is frequently adherent to the underlying cortex, then the ideal method of drainage would be directly through this adherent dura into the abscess cavity itself—a cerebro-dural route well walled off by the adhesions of an earlier localized meningitis; but to attempt exploratory punctures through the dura, the sterile subdural spaces and into the cerebral tissue itself in the *hope* of locating an abscess of the adjacent areas of the brain and through the "dirty" infected field of the mastoid, or the infected sinus or the infected fracture of the vault—this method of operative procedure is not only lacking in surgical principles but, if the brain abscess is not found, it most assuredly aids in the formation of multiple subcortical abscesses as a result of the exploratory punctures and the extension of the in-

fective process to the meninges so that an acute meningitis and meningo-encephalitis usually result. For fear of being misunderstood, it is only in those cases of brain abscess formation which lie directly beneath the dura of the infected area such as the mastoid, and where the dura and the underlying cortex are adherent and well walled off by the adhesions of a former localized meningitis that this method of opening the dura or puncturing it through the infected field of the mastoid should be advocated; if at the local operation of mastoidectomy or at the removal of infected cells of the sinuses or of infected bone of the fracture of the vault, there are found definite evidences of a subdural abscess in the color of the dura or of a cortical or subcortical abscess in the bulging, non-pulsating dura adherent to the underlying cerebral cortex, or if that most rare "stalk" of the abscess should be located, then in these patients and in these patients alone is it a rational and safe procedure to open or puncture the dura through this infected extradural field in the knowledge that the brain abscess lies directly beneath the operative area and that the sterile subdural spaces are well walled off from the site of operation and drainage. In a large percentage of patients, however, the local operation does not disclose any definite signs of a subdural lesion and the dura is not adhered to the underlying cerebral cortex, and these are the patients in whom it is distinctly dangerous to open or to puncture the dura and to explore intracerebrally in the hope that the abscess can be thus located and successfully drained; if the abscess is found by the first puncture opening, then its drainage through the sterile subdural spaces by a small opening is associated by the great risk of a purulent meningitis and if the abscess formation is not present or at least not located, then the danger of multiple abscess formations and a diffuse meningitis and meningo-encephalitis resulting from the exploratory punctures themselves is more than a probability.

It is in these fairly frequent cases where it is impossible to state with accuracy at the time of the mastoidectomy that the brain abscess lies directly beneath and contiguous with the dura of the infected mastoid area, and if the presence of a subtentorial and cerebellar abscess has been excluded (and cerebellar abscesses are the more easily diagnosed than the supratentorial and especially the temporo-sphenoidal ones)—it is in these patients that the operation of exploration of the temporo-sphenoidal lobe and the adjacent

areas of the brain should be made through the "clean" subtemporal route as in the operation of subtemporal decompression and drainage; naturally, the vertical incision should be used. If the brain abscess is not found, then the exploration has been performed with little or no danger of a resulting meningitis and at least a decompression has been afforded the patient so that the abscess may localize itself later; and if the abscess is found, then it can be freely drained through the wide subtemporal opening with less risk of a meningitis occurring owing to the decompressive effect of the operation itself; if the abscess is in that part of the temporo-sphenoidal lobe adjacent to the infected mastoid area, then additional drainage of the abscess cavity may be obtained through this area. It has been my experience in these patients that cerebral tissues as well as the meninges are definitely resistant to infection from the drainage pus of the abscess itself if the intracranial pressure and the local pressure of edema both from the abscess and from the operation itself, are not high, so that this exploratory operation of drainage through the subtemporal area is not only an efficient means of drainage if the abscess is found, but the complications of meningitis and meningo-encephalitis are greatly lessened; besides, this method of approach makes possible a much more extensive exploration of the brain so that if the abscess is not situated in the adjacent temporo-sphenoidal lobe, yet it can be satisfactorily drained if found in the ipsilateral frontal, parietal or even occipital lobe; in my series of brain abscess cases, there are several of them which undoubtedly would not have been found if the exploratory puncture needle had been used through the mastoid area alone. As an efficient means of drainage, the double glass tubes, one tube within the other so that the outer tube always remains in place in the abscess cavity while the inner tube can be removed and used as a means of suction-drainage—this method has proved to be of distinct value.

In abscess formations of the cerebellum complicating otitic disease, the diagnosis and localization are usually not so difficult as in supratentorial lesions, and if at the operation of mastoidectomy with the dura exposed, there are definite signs of an underlying cerebellar abscess either in the cerebello-pontine angle or in the contiguous cerebellar lobe, then the dural drainage-puncture should be made directly into the abscess formation, but if the location of the subtentorial abscess is not definitely known, then I believe no dural puncture should be made through the infected mastoid area

but rather through a "clean" incision through the adjacent occipital area—that is, a unilateral suboccipital exploration and if necessary a bilateral operation. I shall always remember the patient of Doctor Duel, 4 years ago at the Manhattan Eye and Ear Hospital, upon whom I performed a left unilateral suboccipital exploration for a diagnosed left cerebellar abscess following a left mastoiditis and mastoidectomy and, not finding the abscess in the left half of the cerebellum I continued the exploration by performing a bilateral suboccipital exposure to find a right cerebello-pontine angle tumor. This patient, however, died following the prolongation of the operation and it would have been better judgment to have planned a two-stage operation.

In conclusion: the mortality of patients having the condition of true brain abscess is high; without operation practically 100%, and with operation 60% and even higher. The diagnosis of the intracranial condition and then its accurate localization are most difficult, and for these reasons the operation of drainage must almost always be considered as an exploratory procedure. The ideal operative approach is the direct one—through the infected mastoid area, dura and into the adjacent abscess cavity—but only in the presence of an adherent dura to the underlying cerebral cortex and thus walling off the infective process; in those other selected patients in whom the accurate localization of the abscess is not possible and in the absence of an adherent dura to the cerebral cortex, then an exploration of the cerebral hemisphere should be performed through the "clean" subtemporal area, and if the abscess is found, then satisfactory drainage can be obtained, and if the abscess is not located, then the risk of a resulting meningitis is practically nil, and it may be possible later to localize the abscess and to drain it. This operation, however, should only be used in these selected patients and the operations of mastoidectomy with wide exposure of the dura should always precede it in order to remove the primary infective focus and at the same time ascertain the presence or not of definite signs of an adjacent brain abscess; if these signs are not present, however, then the dura of this infected area should not be punctured in the hope of locating the abscess—the risk of a resulting meningitis is then very high whether the abscess is found or not.

20 West 50th Street.

A NEW FORM OF MEDICATION FOR THE NOSE AND NASO-PHARYNX PRELIMINARY REPORT.*

DR. WOLFF FREUDENTHAL, New York.

After many years of experimentation and anatomical study we have learned how to operate for certain pathological conditions in the nose. The routine work of a nose specialist consists nowadays largely in correcting deviated septa, removing turbinates and operating on infected sinuses. Thousands of cases are helped in that way, while many more are relieved only to a slight extent, or not at all. These patients continue to have a fullness in the head, dryness in the nose and throat, formation of crusts, headaches, etc. Such conditions, of course, do exist in the absence of any previous operation and are known under different names. To combat them there are many means at our disposal nowadays. Some patients are relieved by using a Bermingham nasal douche containing a saline or any other mild solution, others by an oily or watery spray, still others by some salve squeezed up into the nasal chambers by means of a Schoonmaker or any other tube or applied on a cotton carrier and so on. Yet many are not relieved by any of these means, and that for various reasons. The main cause for this failure is that in many cases neither a spray nor an ointment applied by the patient himself will reach the parts that are principally affected, these being located either too high up in the nose or up on the vault of the pharynx. This holds true even for those patients who have learned the dangerous use of a post-nasal atomizer. In other instances the spray passes through the inferior meatus and out into the mouth, doing little or no good. If the patient directs the spray towards the frontal sinus he will promptly develop a headache or an otitis and stop its use entirely.

As to ointments, which are beneficial in some cases, it has been my experience that they are not absorbed in a number of instances. On examination you may find the salve applied the night before still adhering to the introitus narium or even further up in the nose. Or, as one patient told me, particles of the ointment will fall back into the throat and irritate it without exerting any influence on the nasal mucosa. The reason why a salve does not become absorbed will be discussed later.

For years it has been my aim to apply some form of medication to the nose that will remain in contact with the affected parts

*Read at the Annual Meeting of the Eastern Section of the American Laryngological, Rhinological and Otological Society held at Newark, N. J., February 7, 1920.

longer than the usual remedies without any risk of injury to the ear or to any of the accessory sinuses. For that purpose I tried ten or more years ago nasal bougies which could be inserted by the patient himself. These attempts were given up, because they were unsatisfactory in the majority of cases. In wide chambers the bougies either fell into the pharynx before they were melted, causing occasionally an alarming choking sensation; or when the patient bent his head forward or downward, they dropped out anteriorly.

To overcome this difficulty and to make it possible for the medicament to remain in contact with the mucosa, even after the bougie was melted, I constructed last year a little instrument that consists practically of nothing more than a few wires fastened together. Its object is to serve as a holder for the bougie, so that the latter may remain in situ, that is in contact with that part of the nose that you want to reach.

Its construction will be understood easily from the picture (see Fig. 1).

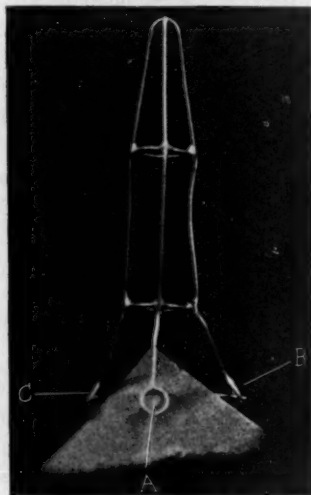
The modus "operandi" is as follows: You grasp the holder by any of the prongs—a, b or c, and insert the bougie as far back as it will go. Then adjust the wires around the bougie so that it will be held tightly, and insert the holder into the nose. If you want to reach the inferior meatus, the procedure is simple enough. If the middle meatus is your aim, it may be advisable to place a little pledget of cotton at the anterior end of the holder in order to prevent the bougie or its melted contents from falling out anteriorly. The prongs may or may not be turned inside, so as to make it more secure. The application can be made easily in your office without cocaine. In sensitive persons a few drops of a one per cent solution of cocaine will generally overcome any irritation, but whenever possible, I prefer to do without it.

If the patient is to use the bougie himself at his home, he ought to be shown how to apply it. In narrow nasal chambers a holder is not required. All the patient needs to know is whether to pass the bougie upwards or backwards. It may be well to suggest that everything be left in the nose for at least 20 minutes. Whatever runs back into the throat, may be expectorated; the rest remains in the nose and in contact with the affected part long enough to exert its medicinal effect.

I have used mostly bougies containing boric acid with cocoa butter. The cocoa butter acted better than a solidified neutral oil

which I also tried, but with unsatisfactory results. Of late another base for the bougies was tried and I shall report on this later.

Boric acid was used because it so readily dissolves the dried secretions and helps to lubricate the mucous membrane. Among other ingredients that have been employed by me, I would mention tannic acid, eucalyptol, and adrenalin. In one case of perennial vasomotor rhinitis adrenalin bougies were applied with great success. At first the patient could not stand them as they caused a great deal of irritation, but after spraying the nose a few times with a little cocaine solution the bougies were easily applied by the patient himself and very soon without the need of cocaine.



As a rule it takes from 3 to 8 minutes before a bougie is dissolved. To prevent the "flowing away" of the dissolved portions it is best always to place a piece of cotton in the nose. Sometimes much more time is required to dissolve a bougie and in very rare instances they will not dissolve at all. These are the cases that show absolute atrophy of the mucous membrane. As already stated, in some patients the application of drugs to the nasal mucosa is entirely useless—for example, an ointment applied the previous night may still be seen the next morning. This you will find whenever the mucosa is covered by a layer of tenacious secretion which is often hardly or not at all visible. Such a condition of itself is apt to arrest the functions of the membrane, since

a mucosa that is not normally moist serves no useful purpose. Sometimes the application of the ointment or of a spray is so irritating as to cause a flow of secretion in a mechanical way, and in this respect it is immaterial what kind of medicament is employed so long as the desired effect is brought about. In other cases, where a process of atrophy has set in or for other reasons, such applications will have no effect whatsoever. This will also happen when the patient has become accustomed to nasal applications and his mucosa is, so to say, hardened—it does not react any more. The following case was very characteristic. Professor P., aged 73, suffers severe pain at the tip of the nose, which is red and covered with black crusts at the introitus narium. After softening and removing these crusts as much as possible, bougies were inserted. These dissolved readily in the upper parts of the nose, but not at all at the entrance, thus showing clearly why crusts tend to form there and why they are apt to recur under similar climatic conditions.

By applying a nasal bougie we are to a certain degree enabled to judge approximately how far the physiological function of the mucosa has been destroyed. Thus in several cases of atrophic rhinitis it took 20 minutes before a bougie was dissolved, while in similarly wide nasal chambers without atrophy it was dissolved within from 4 to 8 minutes. In other cases the difference was not so marked.

Now a mucosa that is not moist, can be made so by previously applying some watery solution to it. Thus it can be made to perform its physiological function to a certain degree, that is, to absorb whatever is brought in contact with it, or to dissolve it by its own natural heat. Consequently I have sprayed experimentally one side of the nose with some fluid, leaving the other alone. Then bougies were placed in both nostrils. The difference was quite pronounced, the moistened side reacting much quicker than the other. In one case, that of Mr. M. S., the bougie in the moistened side was dissolved within 5 minutes, in the other side, in 16 minutes. But there were many exceptions to this rule, until it was discovered that by spraying one side the other also gets its share of moisture in many instances. For that reason a tampon dipped into lukewarm water was inserted, and apparently with better results.

Naturally, one must not forget that moisture, although the most important factor, is not the only one concerned in the physiological activity of the nose. Heat is another factor which depends *ceteris*

paribus on the activity of the entire musculature of the body. One has to reckon furthermore with the condition of the mucosa and submucosa, the swelling bodies and other things.

As remarked before, one can approximately estimate the physiological activity of the nose by the time it takes such a bougie to dissolve. This physiological activity is not only diminished in so-called "dry cases," but in other affections as well. A priori one would not expect normal function on that side of a nose which is almost entirely closed by a deviated septum or polypi. On the other hand a patient, Mrs. S. L., was examined by me while she was suffering from an acute empyema of the antrum. After irrigation and removal of all the visible pus, when the nasal chambers were free, it took as much as 15 minutes to dissolve a bougie, very naturally so. For here the entire mucosa and submucosa were in a succulent condition and functioning subnormally. The same was noticed in a case of hypertrophic rhinitis without the mucous membrane being dry. In most of these pathological conditions, and especially so in the case of a sinus affection, there are present alterations of a nutritive character that sooner or later extend to the nasal cavity itself.

After all that has been said in this preliminary paper you will understand that this bougie treatment has been introduced to assist, not to replace office treatment by the physician. Parenthetically it may be added that lately Dr. Otto T. Freer of Chicago published an article on the cataphoretic application of silvol in atrophic rhinitis and ozena (*The Therapeutic Gazette*, April, 1919). I have had no chance to test Freer's method, but from past experience I have learned to take seriously anything from his pen. As this is the only new method in the therapy of these diseases it has been mentioned here. But it can be applied only by the physician, while the bougie treatment can be carried out by the patient himself.

In conclusion the writer may be permitted to say a word in favor of nasal medication for systemic purposes. From accidents reported in medical literature it is well known how quickly a drug is absorbed when injected into the nasal mucosa. In one instance, observed by the writer, death occurred within a minute after the rapid injection of adrenalin. May it not be possible to use this method with due precautions in serious cases where quick action is urgent? Extensive and careful experimentation along these lines may bring us a step forward.

59 East 75th Ave.

TWO CASES OF FOREIGN BODIES IN THE BRONCHI.

DR. CHARLES J. IMPERATORI, New York.

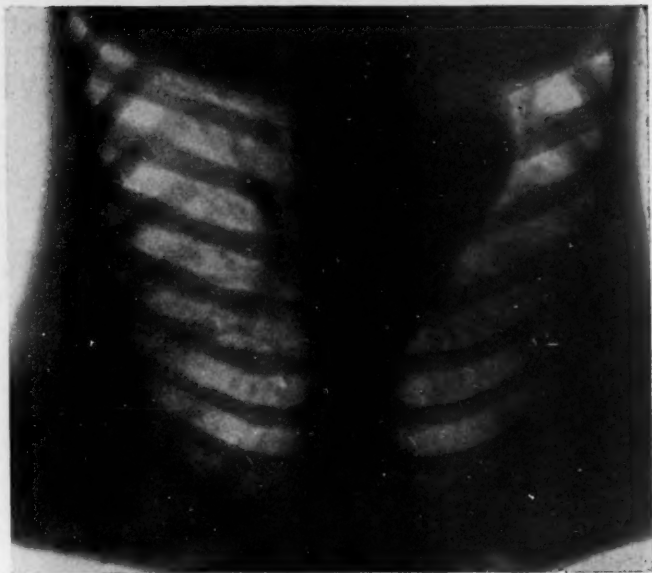
The two interesting cases reported below were seen on the service of Dr. C. G. Coakley at Bellevue Hospital. The recital of the cases is confined exclusively to the special conditions, that existed, and the family history and the past history, etc., is not included, excepting to note, that both cases date the onset of the present condition to the inspiration of a foreign body.

A. E., 14 months old, was admitted to Bellevue Hospital, November 29, 1919. Four days previously while playing on the floor, on which was chewing gum, candy and grapes, the child was suddenly seized with a severe strangling attack, that lasted for over an hour. During the interval, from the first strangling attack and admittance to the hospital, there had been several attacks of dyspnea and a gradual increasing cyanosis.

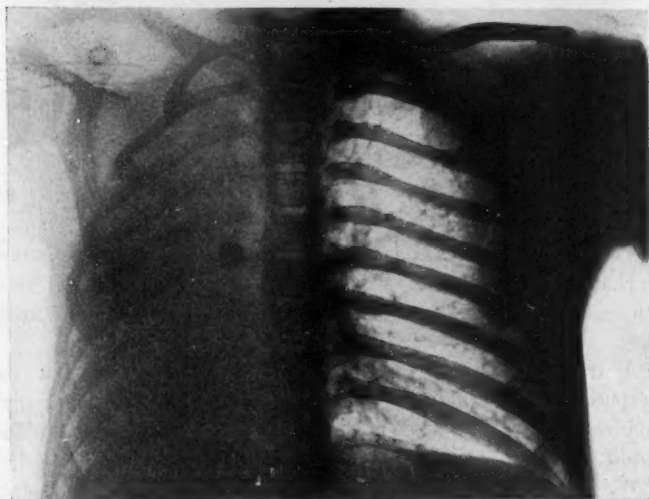
When first seen the temperature was 101°, pulse 140, and respiration 48, and considerable dyspnea of an inspiratory type with a marked cyanosis. With the history of the sudden dyspnea, it was assumed that the little one had inspired a foreign body, but the radiographs failed to show anything, excepting that the diaphragm on the right side was flat. Laryngoscopic examination showed some inflammatory reaction, especially of the ventricular bands and the arytenoids. There was some sub-glottic inflammation, and the passage of the 4 mm. tube was somewhat obstructed while passing through the cords.

From the history of the case and the radiograph, showing the flattening of the diaphragm on the right side, the right bronchus was examined first. A foreign body was seen in the lower end of the right bronchus. The exact character of what the foreign body was could not be determined at this time. Using a small rotation forceps, the foreign body was partly pulled into the end of the bronchoscope and all removed together. It proved to be a branching grape stem. The largest branch being about three-fourths of an inch long, the smaller, half-inch and the stem was one-fourth of an inch.

The time for this procedure was eight minutes. No anesthetic was used. Oxygen was given through the bronchoscope during the instrumentation. Further examination of the bronchi did not re-



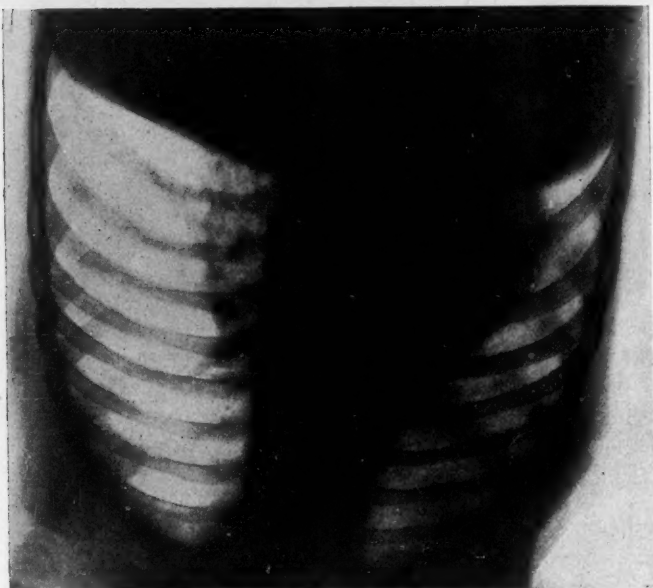
Case No. 1. Showing the flattening of the diaphragm on the right side.



Case No. 2. Showing the foreign body in the left bronchus.

veal any other foreign body. The site of the grape stem in the right bronchus was very much congested and considerable mucopurulent material was aspirated before and after removal of the foreign body.

The child remained in about the same condition, that is, the breathing never went under forty-eight and at times was sixty per minute.



Case No. 3. Radiograph taken ten hours after removal of foreign body.

The cyanosis increased and the dyspnea was markedly inspiratory in character. Laryngoscopic examination at this time—twenty hours later—showed the larynx, that is, the cords congested and edematous.

A tracheotomy was done to relieve this condition—but the dyspnea became worse, the cyanosis deeper, and the child died eighteen hours later. The cause of death was exhaustion and pneumonia.

W. D., aged 8 years, was induced by his playmates to place a three-eighths inch steel ball, that they had salvaged from Ford

automobile, in his mouth and then see how far he could eject the ball. Unfortunately, he inspired the ball and for two hours had a severe attack of dyspnea, from which he recovered and felt all right until the next day. He was brought to Bellevue Hospital on September 3, 1919, thirty-six hours after the accident, complaining of pain in the left chest. Radiographs of the chest showed a spherical foreign body located in the left bronchus, with a consequent diminished aeration of the left chest. Under ether anesthesia, the bearing was located in the left bronchus, at and in the bronchial ramus to the superior lobe.

A 7 mm. Jackson bronchoscope was used and with the aid of a Hubbard hook, using it as a spatula, the ball was dislodged and extracted, using the four-pronged Brünings forceps.

The foreign body being two mm. larger than the tube, it was necessary to remove, bronchoscope, forceps and foreign body together.

The time required for the extraction was 20 minutes.

The cases are of interest for the following reasons:

I. The value of radiography even though the shadow of the foreign body is not recorded.

II. The seriousness of all cases of food aspiration.

III. In the last case the difficulty in the removal of the ball bearing because of the size and shape.

IV. The difference in the radiographs of the chest before and after removal of the foreign body, that is, the difference of the pulmonary shadow. The last radiograph having been taken within ten hours after removal of the foreign body.

17 East 38th St.

THE NEW YORK ACADEMY OF MEDICINE.

SECTION ON LARYNGOLOGY AND RHINOLOGY.

(Continued from May Issue, page 342)

DISCUSSION.

DR. IMPERATORI stated that he had used paraffin en bloc—as a dressing following radical mastoidectomy. This method was suggested by Dr. H. P. Mosher of Boston. Most of the cases that were treated this way were patients in the Otolaryngological Service of Bellevue Hospital.

The results that were obtained were not favorable. Of course one cannot arrive at a final conclusion with only a small number of cases and this method of after treatment should be further worked out—possibly with some modifications.

The hearing function in mostly all the cases was markedly lessened; this was due to excessive granulation tissue formation, that would spring up between dressings. These granulations would appear particularly in the region of the oval window.

In most of the cases the whole bone cavity was covered by granulations within ten days after operation. In the last cases operated, the use of the paraffin was discontinued at this time and the cavity left open. As paraffin appears to stimulate the formation of granulation tissue, it would seem to be of use, as suggested in the repair of the wound following the simple mastoid operation.

DR. SORESI agreed that Dr. Imperatori was perfectly right as paraffin does favor the formation of a great amount of granulation, and in a radical operation this might not be convenient, so that in these cases perhaps it would be better not to use paraffin which—especially if used in block—will fill even the smallest corners and produce too much granulating tissue. Dressing any wound with paraffin increased the secretion from the wound very greatly. It had been the speaker's experience, however, that in a few days this secretion decreased and shortly disappeared altogether much more quickly than when the paraffin had not been used. He had published a paper on this subject in 1915. Some surgeons who had tried it gave it up for just the reason given by Dr. Imperatori, that they were afraid the use of paraffin would increase the secretion, and in this they were right; but, as has been said, the secretion soon diminishes, healthy granulations grow up and the skin quickly covers the healthy granulations, providing a most agreeable surprise for the surgeon who has persevered with the treatment. The scar resulting is so good that it is often hardly noticeable.

DR. IMPERATORI inquired about the size of the original mastoid incision and the size of the stab wound, and the relation of the stab wound to the incision—for a simple mastoid; to which Dr. Soresi replied that in simple mastoid he made a medium size incision and a stab wound just sufficient to allow for the passage of the paraffin drainage.

One speaker stated that he had not seen this particular motor before, but in one of the institutions where he had worked they have a very heavy motor. With this one could do the complete radical mastoid. He had exposed the sinus with the burr without injuring the vessel. It was not an instrument for a novice to use nor a man with poor muscular development nor poor co-ordination. A sclerotic radical would simply melt away under the application of this instrument. If dealing with a suspected brain abscess or gathering, the chisel and rongeur are almost out of the question on account of the eburation that is present. An important part of the technique is to keep the motor and burr cool. The mastoid gets very hot, and in one instance a temporary paralysis

resulted due to the heat. That motor is often out of order and difficult to sterilize. The motor Dr. Soresi was presenting has the advantage that all the parts that come in contact with the surgeon can be sterilized very easily with oil of paraffin; the handle can be held in the hand very comfortably and the cutting instruments can be changed very rapidly, so that a simple mastoid could be done with it in less than five minutes.

DR. KAHN said that some time ago he had reported the use of paraffin in the radical mastoid cavity. He had gotten the idea from using paraffin where skin grafts were employed after burns. Two cases were treated. The grafts were removed and placed in the meatus the cavity being thoroughly sterilized beforehand. The cavity was sealed with paraffin and a piece of cotton put in the external auditory canal. In one case a very good result was obtained, but in the other the graft failed to take.

Presumably the paraffin drains are to be used entirely with the gravity method, but most mastoids were not gravity cases; the patient is lying on his pillow with his ear up. The advantage of the gauze was due to the fact of the adhesion of the particles of fluid inside of the tubes of the gauze fibre. The paraffin is entirely closed. The paraffin drains only where there is gravity, the fluids running out along the side of the paraffin. The paraffin cannot drain uphill. There is not any real advantage; the real advantage of the gauze is on account of the adhesion of the pus and secretions as they climb up. The gauze has a tendency to help localize the infection.

Dr. Jansen of Berlin uses the burr almost entirely; he employs it to smooth out the cavity, where it has marked advantages, particularly where you want to be very exact. In labyrinth operations and in cases where one wants to clean down the facial ridge it would seem to be excellent.

DR. SORESI answered Dr. Kahn by giving it as his opinion that the use of a paraffin dressing over skin grafting was the worst thing that anyone could do, because as he had said before, paraffin will increase enormously the secretion of the tissues covered by it for the first few days and in almost all cases this abundant secretion is fatal to the grafting. But the skin grafting may often be avoided by the use of the paraffin drainage, for then the epithelial cells from the surrounding skin can extend over the area to be covered very readily when the tissues are covered by a paraffin dressing.

DR. KAHN said that Dr. Davis of the Johns-Hopkins hospital had reported some work with very good results.

To this Dr. Soresi replied that he had no intention of contesting what others had been able to do, or the fact that they had obtained good results, but that he was quite satisfied from his own experience and from the experience of many other surgeons, that skin grafting is always impossible when the surface of the skin with the grafting has been covered with paraffin.

About the difficulty of draining by gravity in mastoid cases, this supposed difficulty does not exist, because the patient's head can always be raised somewhat, so that the point of exit of the paraffin drainage is always lower than the point to be drained. About the use of gauze Dr. Soresi stated that gauze becomes impregnated with pus and the pus stagnant in the gauze was an excellent culture medium for micro-organisms. Asked what kind of paraffin he used and how drainages are kept ready for use, Dr. Soresi answered that any paraffin is good and that paraffinated gauze can be preserved indefinitely in any antiseptic solution or in alcohol if the gauze is well covered with paraffin the preserving liquid will never affect it.

DR. HAYS said that the wicks would seem to be quite ideal in simple mastoids where the sinus or dura was not exposed, and it was desirable to close the wound, for they could be left in place for a considerable length of time.

SECTION ON OTOLGY.

*February 13, 1920.***Two New Instruments for Reaming the Upper End of the Eustachian Tube in the Radical Mastoid Operation. DR. ALFRED KAHN.**

(A detailed description of these instruments appeared in THE LARYNGOSCOPE, March, 1919)

Cavernous Sinus Thrombosis following a Secondary Mastoidectomy. DR. JOHN A. ROBINSON, New York City.

(To be published in a subsequent issue of THE LARYNGOSCOPE.)

DISCUSSION.

DR. LEWALD inquired if any radiographic plates were made.

DR. ROBINSON replied that an attempt was made, but the patient was so irrational and restless that the results were very unsatisfactory and played no part in the diagnosis.

DR. MAYBAUM said that Dr. Robinson's case recalled to his mind one in many respects similar to it which came under his care two years ago at the Manhattan Hospital in the service of Dr. Berens. The patient, a boy of twelve, gave a history of having had a fracture of the skull three years previously and of having had a suppurating ear for a number of years. At the time of admission, he had an acute exacerbation of the middle ear condition—of three weeks' standing—temperature of 104° and chills. The general condition was bad. He could not at the moment recall whether or not the child's blood culture was positive. Upon opening the mastoid, a perisinus abscess was found, the sinus being in bad condition. Because of the history and the necrotic appearance of the sinus wall everything else having been ruled out, it was deemed advisable to explore the sinus. A clot was found in the sigmoid sinus. There was an entire absence of bleeding from the jugular end, but free bleeding from the torcular end. The jugular vein was then ligated and the exploration of the sigmoid sinus was carried as near to the bulb as possible. The following morning the boy began to show typical signs of cavernous sinus thrombosis—exophthalmos on the side of the operated mastoid and later the other side also, paralysis of the eye muscles, dilated pupils, and chemosis of the conjunctiva. The chemosis of the conjunctiva and paralysis of the eye muscles differentiate the condition from a somewhat similar eye picture seen in orbital cellulitis following a purulent ethmoiditis.

These cases of cavernous sinus thrombosis all prove fatal. While the condition is comparatively rare, still it may be seen in groups. Three weeks following the case cited, another case of cavernous sinus appeared in the service of Dr. Berens in the care of Dr. Braun.

Meningitis following Destructive Labyrinthitis. Operation. Recovery with Hearing. DR. EDMUND PRINCE FOWLER.

DISCUSSION.

DR. DWYET said that this was one of the most interesting and instructive cases he had ever seen. The child was apparently in the last stages of a low grade meningitis, and seemed as though it could live but a few hours. On getting the spinal fluid pus was found. When the child was seen the next day she seemed very much improved, and on getting the ear history it was thought that the only chance to save the patient's life was to go in and operate. When Dr. Fowler operated, he found what seemed to be an abscess of the mastoid that had occupied the external semicircular canal; the canal showed the lumen with the outer wall entirely eaten away and fluid exuding. The case was regarded as a cholesteatoma that had uncapped the semi-circular canal and was leading into the labyrinth and bearing in mind the history of the onset of a

probable acute labyrinthitis, the operation was stopped, for it was thought that with the original focus removed and the drainage continued the case would do better. That was the interesting point so far as the child was concerned, for she was alive and well.

When the patient had been presented to the Otological Society, the point was raised that the case could not have been a true destruction of the labyrinth, and he had then argued that we are too prone to assume that we know all that is to be known about the labyrinth—and to assume that it was not totally destroyed was begging the question. It seemed desirable to place on record a case where the hearing returned after the labyrinth had apparently been destroyed. Dr. Norval Pierce of Chicago reported such a case where the hearing was tested.

Dr. Dwyer repeated that the point he wished to emphasize was that we do not need to be as radical in operating on the labyrinth as we have been. If this child's labyrinth had been operated upon she would probably have died since a new path of infection would have been opened up. No organism was found in the spinal fluid. Was it meningitis or not? Dr. Kerrison said that unless we could prove the presence of the organism we do not have meningitis. This child had all the typical symptoms of meningitis. The history Dr. Fowler got from the Health Board reported various punctures but no organism present, but they treated her with meningococcic serum. Here was a history of an acute labyrinth condition a month previously that she took care of and was probably taking care of it for weeks before. When you remove the source, you remove the infection.

Dr. S. J. KOPETZKY said that he had heard the previous presentation of this case of Dr. Fowler, and hearing it again tonight, and thinking about it since the last time, he wished to make a few observations from his own viewpoint:

He accepts every observation made by Doctors Fowler and Dwyer as facts, and does not take into question any observations interjected into the discussion. He also accepts as facts observations made by Dr. Pierce in reporting a similar case some time ago. From this standpoint—accepting all these statements as facts—the case presented by Dr. Fowler, is, nevertheless, *not* one upon which to formulate indications for operation upon the labyrinth; for if one were to accept the case of Dr. Pierce and this one of Dr. Fowler as a basis for formulating indications and contraindications for operation, then one would have to revise our present conception of the transmission of sound impulses—in other words, revise our physiology of the cochlea and the static labyrinth. Dr. Kopetzky is not prepared to do this at the present time.

In the case before us for discussion this evening, before one could properly draw conclusions from it, that case would have to come to post-mortem examination and section examinations made of the labyrinth, so as to determine exactly what happened—what lesions were present and what remains of the labyrinth at the present time—which, fortunately for the patient will not have to be done on this child for many years. For if this labyrinth was destroyed by the formation of pus, and it now transmits sound, then it is up to otologists the world over to find some other organ to account for the perception and transmission of sound impulse.

Dr. Kopetzky finds one symptom of acute labyrinthitis lacking in the presentation of this case; namely, the so-called "forced position" which acute labyrinthitis usually present. Furthermore, it must be pointed out that this child had a meningitis month prior to coming under observation. Many years ago, Dr. Richards, in his paper on labyrinthine infections, showed that pus breaks into the labyrinth from the meninges many times, just as pus reaches the labyrinth from the mastoid and middle ear cavity. In the cases where the meningeal infection is the source of an eruption of pus into the labyrinthine channels without ear disease, as it sometimes happens, the deafness that follows such a menin-

geal infection has been noted by many observers, and is thoroughly understood as to its course and results. In this case, such a route is possible, even though coincidental to it a mastoidal infection was present.

Dr. Kopetzky considered this case an exceptional record, and said that the child should be kept under observation for a long time. One could only speculate as to what might have happened. Here was a child with meningeal symptoms a month prior coming under otological observation. The Board of Health of New York City suspected the case to be a cerebrospinal meningitis of the intracellular meningococci type, and gave treatment by antimeningococcus serum for the same. Thereafter one finds the patient in the hospital with mastoidal involvements and indefinite symptoms which are not clearly enough demarcated to say that a diagnosis of labyrinthitis is established prior to operation. On the operating table, labyrinthitis and meningitis are apparently established by the findings, and then, subsequently, during the after treatment, a return of hearing is noted, and complete recovery takes place. This, in substance, constitutes the facts. The rest, is all a matter of speculation.

That the surgeons evinced sound surgical judgement is apparent by the results, for sufficient drainage was established; yet no one could make claim that such a case should be the basis for either conservatism or even a change in opinion regarding labyrinthine operation upon the indications as they are already established by many competent observations and operative findings, as well as by results obtained under the accepted standards.

Finally, one has a right to question the diagnosis of meningitis at the time the patient was in the Manhattan Hospital, because there is no evidence of the presence of an invading organism within the meninges. Clinically, one is correct in summing up the manifestations seen at the bedside and calling them meningitis, but unless an invading organism is demonstrated, one must bear in mind that many conditions will produce a symptom picture which can roughly be grouped under the classification "meningitis."

Dr. GERARD H. COX said he did not understand that any one had claimed that the labyrinth was totally destroyed. The child certainly had a labyrinthitis and she must have had a meningitis though the organisms were not found.

Dr. SAUNDERS congratulated Dr. Fowler on the surgical judgment displayed in the case. That must always be an important factor in the treatment of these cases, since in our present state of knowledge we cannot formulate any line to be followed. Dr. Dwyer had struck the right keynote when he said that we have been too long following the dicta of the Vienna school. Every case should be decided upon its merits, and much will depend upon the surgical judgment of the surgeon.

Dr. LEDERMAN said that Dr. Fowler's experience was very instructive and showed the importance of masterly inactivity in some of these cases. In corroboration of this point of view, he cited a case in which the clinical and pathological evidences indicated meningitis following a chronic mastoid infection which had been operated upon a year previously at another hospital. The patient was a child eight years of age who was admitted to the pediatric service at Lebanon Hospital with a mastoid fistula, increased temperature and headache, Kering's sign with rigidity of the neck, and an increased cell count in the spinal fluid. The heaving was good. Upon operation the mastoid process was found to be considerably diseased; the dura in the region of the middle fossa was exposed but seemed healthy. No other area of disease was noted, and there was no further exploration. The symptoms promptly subsided and the child made a good recovery. There has been too great a tendency to extensive operative interference in many of these complicated cases, and a little waiting is often advisable.

Dr. ALFRED KAHN said that it was very difficult to decide just when to go in and do a labyrinth operation. It was very fortunate that Dr. Dwyer and Dr. Fowler had brought this case before the Section to emphasize the value of conservative surgery, and the need for exercising great caution before going in and doing a radical procedure where the mortality is so high, without having definite and positive symptoms.

Dr. Kahn said that last year he had reported a somewhat similar case where the labyrinth was destroyed; the patient was in an unconscious state, a temperature of 106°, with Kernig's sign and other symptoms of meningitis; and the question arose as to whether or not a labyrinth operation should be performed. It was thought that the patient would die anyway, so it was decided to let him alone, and he made a complete recovery.

What are the indications for deciding to do a labyrinthectomy in meningitis? Cases very similar to this have been operated upon where meningitis has been present, with labyrinthitis. The radical operators hold that if the operation is to be done it should be done immediately and not wait for any dangerous symptoms and that such cases offer a chance for recovery, while if they are allowed to proceed they terminate fatally. On the other hand, it has been proved by a number of cases on record that patients have recovered where the septic state and other indications were present. Those against the operation hold that when the operation has been performed and the patient has recovered that the condition was a serous and not a purulent meningitis, i. e., that if the patient recovers it was a serous meningitis; if he dies, it was a purulent meningitis. This sort of reasoning does no good.

Dr. Kahn said he had reviewed the literature of the subject and quite a few similar cases were reported, especially from Vienna. They have made it a law to do a labyrinthectomy only when the labyrinth is absolutely dead—no reaction to caloric, etc.—when a very radical sort of labyrinth operation is performed.

At the present time our knowledge is insufficient to tell just what to do in these cases, and they should all be reported and the statistics collected so that we may be able to arrive at some definite conclusions.

Dr. WESLEY C. BOWERS said that in the absence of positive signs as to the necessity of draining—or not draining—an involved labyrinth, his opinion was that one had to depend entirely on the findings at the time of operation. In determining whether a labyrinthitis is purulent or serous, the consensus of opinion—and the only indication we have at present—is that when there is a total destruction of function in a very short time, the probabilities are that it is purulent. We have no positive data as to treatment, whether it is better to drain—or not to drain the labyrinth. The three following cases—two without and one with, drainage—were all undoubtedly purulent and all got well, leaving the question of the best treatment still a very doubtful one in his mind.

Case 1 gave a history of a discharging left ear for four days. Examination showed fullness, no bulging, landmarks obliterated, no mastoid tenderness, hearing about 10-20. A myringotomy was done. Three days later, without warning, he suddenly developed severe vertigo, projectile vomiting, and headache. Within twelve hours, the hearing was lost entirely and the labyrinth did not respond to stimulation. Because of the suddenness of the onset and the complete loss of function in so short a time, it was deemed advisable to drain the labyrinth. The patient made an uneventful recovery.

Case 2: Woman was admitted to the hospital with a history of pain and discharge in the left ear, one week; that morning she had become very dizzy and vomited. Upon examination, she appeared to have an ordinary acute otitis media, with some sinking of the upper posterior wall and some mastoid tenderness. The hearing was absolutely lost; the labyrinth failed to respond to any stimulation. The mastoid was cleaned out—the horizontal semi-circular canal appeared normal; the labyrinth was not drained. The patient made an uneventful recovery.

Case 3 had been operated on twice for simple mastoid. After the second operation, he had had a sinus thrombosis and the jugular had been tied off. The child still had a discharging ear, acute exacerbation with considerable bulging of the old scar. A radical mastoid was done. Three days after, the temperature went to 103°; the child complained of considerable pain, was dizzy, restless and had nystagmus to the opposite side; the hearing was completely lost; the labyrinth did not respond to any stimulation. No operative procedure was attempted; the child made a good recovery from the labyrinth condition. He still has no hearing and the labyrinth does not respond.

The fact that you have a cloudy spinal fluid, with a considerable amount of pus, and all the typical signs and symptoms of meningitis, is not a certain indication either that the patient will die of meningitis nor that there is an infection of the cerebral spinal fluid. In a case seen four years ago, there were all the typical symptoms; marked opisthotonos and very marked Kernig; patient practically unconscious; spinal fluid contained 2,600 cells, and in the neighborhood of 94% polys., was cloudy and under considerable pressure. The child unquestionably had an acute mastoid, with, apparently, a meningitis. A simple mastoid was performed nothing unusual being found. In the X-ray there was a dark spot back of the sinus. Some very hard bone posterior to the sinus was, therefore, removed and an abscess cavity, the size of a hickory nut, entered. This was found to be an epidural abscess. The dura had healthy-looking granulations upon it—otherwise, it appeared normal. The child continued to have marked opisthotonos and Kernig, with more or less delirium, for three or four weeks. A spinal puncture was done every other day. Gradually all meningeal symptoms disappeared and the child made a good recovery. I saw him again not over six months ago and he was apparently perfectly well and developing rapidly.

DR. BOWERS said that it was perfectly true that a great many drum membranes were opened unnecessarily. If, however, they were opened under aseptic precautions, treated accordingly, and after-treatment of the proper sort was carried out, there should be no ill effects. When in doubt as to whether there is any infection of the middle ear, it is far better to do a myringotomy at once than to wait for bulging.

On doing a myringotomy, if no fluid is obtained there should be no irrigation for fear of infecting the middle ear. If serum is obtained it is better to defer irrigation until the following day. If the serous discharge is then profuse and there is any tendency toward caking of the discharge in the canal, irrigations should be started. If pus is obtained irrigations should be immediately instituted. We frequently see ear drums which are pink throughout; if markedly retracted there is probably no infection in the middle ear. If the drum is red and not retracted, the probabilities are that there is infection in the middle ear and it is not necessary in such cases to wait for bulging, as we frequently obtain thick pus from ears of this type. In Dr. Bower's opinion it is much safer, when in doubt, to do a myringotomy than to take the chance of allowing an infection to be shut in in such a dangerous cavity as the middle ear. In the after-treatment alone lies the danger of infecting the middle ear after a myringotomy.

DR. FOWLER said he had nothing to add to Dr. Dwyer's remarks excepting to say that naturally he entirely agreed with him. The two had talked the matter over several times, and it was partly through consultation with Dr. Dwyer that the operation stopped as it did, as he himself was somewhat in doubt as to whether he should go further or stop. The operation was not undertaken with the definite idea of performing the labyrinth operation unless something was found which would indicate that necessity. When the black necrotic bone was found it had to be removed, and the external canal exposed and followed up until the labyrinth was reached and the drainage of the cloudy purulent fluid was

established. It did not seem to be understood by all present that drainage was obtained; but that was just what the operation was done for. As to the question of how much drainage should be established; the fact that the child was alive and well was evidence that sufficient was obtained in this instance. In almost every case that he had seen in children, where more extensive operations were done, the patients are not alive. Of course, had the necrosis been more extensive he would have gone further, but adequate drainage was obtained. It would seem wiser in these cases to go in without preconceived ideas as to what is going to be found at the bottom of the wound, and to be guided by the conditions found there.

A purulent meningitis can cause deafness in two ways: First, as a neuritis; and second, by a mechanical destruction of the nerve endings in the labyrinth. In the one case there may be partial recovery; in the other not. Dr. Fowler said he did not know that epidemic meningitis could cause a pus destruction of the labyrinth; as he understood it, this destroys by a neuritis from pressure. (Dr. Dwyer said that it was 100 to 1, that this was the case but it could possibly be either way.)

The point raised at the New York Otological Society was that there might be a concomitant meningitis with the mastoid involvement—two separate things—but this was straining a point, when there was a long history of ear disease with the labyrinth symptoms coming on suddenly and violently and meningitis following.

Another point; on which he hoped Dr. Dwyer would correct him if he were wrong, was that in meningococcus meningitis the symptoms clear up if they are going to, without relapses. This child had relapses.

Dr. Kopetzky had brought up the point of meningitis going from within out. Dr. Fowler had seen no such case. Dr. Cox's remarks were very apt that, "In so far as we can tell the case seemed very clear cut."

Replying to Dr. Saunders' remarks about following the Vienna school too closely, Dr. Fowler said that at first we naturally followed them, because they were the pioneers; but the cases reported tonight strongly emphasized the fact that we have been too radical in many of these cases. Just because the patient has violent labyrinthine symptoms, vertigo, vomiting, and unbalanced phenomena, is no reason in itself, that the patient has labyrinthitis. These symptoms can be caused by hot water injections, acute otitis and mastoiditis, dislocation of shapes etc. We exaggerate the labyrinthine symptoms, and make a diagnosis of labyrinthitis; the labyrinth may be irritated, but it is not necessarily labyrinthitis.

Replying to Dr. Kahn, Dr. Fowler said that pus around the labyrinth with labyrinthine symptoms does not necessarily mean a labyrinthitis. If there had been in Dr. Kahn's case a pus cavity in the labyrinth, it was doubtful if the condition would have cleared up—for it certainly would not have had drainage. In the old Manhattan Eye and Ear Hospital at 41st street, a patient had come in with violent labyrinthine symptoms. This was diagnosed as a dislocation of the stapes, and the patient got well. No one was then doing this labyrinthine work. Recently in his office a patient from simple polityerization developed the most violent nystagmus he had ever seen, and almost fell out of the chair. The negative pressure in the middle ear being suddenly changed to positive was the cause of these phenomena, and the patient got over them in a few minutes.

The question comes down to the fact, that the labyrinth should be drained—certainly—but how? If we get what appears to be free drainage, that is all we can ask. If there is necrosis, follow it up; but that is no reason why in this case, without necrosis of the promontory, the cochlea should be opened. This child was a very intelligent one, and had no recollection of having had tinnitus. She was so sick that she was carried up in the elevator at once without going through all the

routine procedures. The cochlea function must have been present all the time, but it had been impossible to test it, except as stated.

Repeated spinal puncture, as reported by Dr. Bowers is assuredly a very valuable therapeutic measure, and is frequently relied upon at the Manhattan Eye, Ear and Throat Hospital.

Acute Middle Ear Infections in Children from the Standpoint of the Pediatricist. DR. L. B. LA FETRA.

(This article appears in full in this issue of THE LARYNGOSCOPE.)

Acute Middle Ear Infections in Children from the Standpoint of the Otologist. DR. T. L. SAUNDERS.

(This article appears in full in this issue of THE LARYNGOSCOPE.)

DISCUSSION.

DR. M. H. BASS said he was very glad to have an opportunity of discussing Dr. La Fetra's paper, since the Doctor was the first one who had called his attention to the importance of ear disease in children, fourteen years ago at the P. and S. He had said then that a pediatricist can get along without his stethoscope, for he can listen without it, but he could not get along without an otoscope to look into the ear. The point about acute rhinitis made in the paper could not be emphasized too strongly. The findings of a slightly pink ear drum in a baby is frequently enough to enable one to make a diagnosis of rhinitis. If one finds fever in a baby with negative physical findings—with the exception of very slight changes in the ear drum—he is justified in making a diagnosis of grippe or rhinopharyngitis.

The fact that children cannot localize their pain is very important, and this is not confined to infants. Not infrequently older children also say that they have a stomach ache when the pain is elsewhere, it may be in the ear.

The question of eruption of the teeth causing ear pain is an interesting one and pediatricists are divided in opinion on the subject—some believing that the pain in the ear is a reflex one. In one instance a child of six complained of pain in the ear, but the ear findings were negative, and as a six year molar tooth erupted the pain disappeared.

Dr. Bass said that in some cases instead of incising the drum as some physicians do, he had used hot irrigations with considerable benefit. It seems best to be as conservative as possible in these cases. The pediatricist sees more of them than do the otologists, for frequently the child does not complain and the trouble is discovered only by using the otoscope as a routine procedure.

Anesthesia should be given during paracentesis, except in very small children. Not only can it be done more carefully, but many children are tremendously shocked by a paracentesis without it. He understood that Dr. La Fetra uses chloroform only for this purpose, but he himself had had one very unpleasant experience with it. This was in the case of a child who was given only a few drops of chloroform and was resuscitated only with great difficulty. Since then he has employed ethyl chloride in preference. Many children who have otitis media are of the adenoid type, and in these chloroform is contra-indicated.

He had been much impressed by the point Dr. La Fetra made that the chief indication for paracentesis is the appearance of the ear drum. Many pediatricists depend too much on temperature and general symptoms.

DR. KOPETZKY said he was delighted to hear Dr. La Fetra say that the pediatricist should have an otoscope attached to his stethoscope because one was as important as the other in pediatric practice; and he was particularly glad to note that Dr. La Fetra did not say that the Pediatricist should have a "paracentesis" knife also in his armamentarium; because the use of a paracentesis knife by those practicing among children would form a fruitful discussion before both sections of the Academy—the one on Otology, and the one on Pediatrics.

The subject covered by Dr. La Fetra ranges over too wide a field, and Dr. Kopetzky would discuss only one or two points. First, he wished to present this postulate to the pediatricians: Paracentesis is no cure for mastoiditis, nor will its repeated performance inhibit the evolution of a mastoiditis which is developing. The otologist is too often put in a false position by the assertion of the pediatricist to the patient that if a paracentesis were done, the mastoiditis would not follow; and then as the case runs its usual course, the otologist who first sees it is discredited because the mastoiditis eventually comes on in spite of the paracentesis. A knowledge of the pathology of acute infections of the middle ear and mastoid will show that in many instances both sets of structures are involved simultaneously, and only if a stagnation in the pus flow is prevented, will the mastoid not develop. Therefore, such statements should not be made without due qualifications. Paracentesis will check an Otitis Media, but mastoiditis can develop even if a paracentesis is done every successive day in the evolution of the mastoiditis.

Pediatricians, in Dr. Kopetzky's experience, advise a repetition of the paracentesis too often. If one would only consider what these repeated incisions into the drumhead result in, one would be more apt to endorse Dr. Saunder's remarks that he was after perfect end results. Very often, the pediatricist accomplishes his immediate purpose and evades a possible mastoid operation, and the case resolves itself into a subacute or chronically discharging ear; and the pediatricist, as the patient gets older leaves the field of action and the otologist receives the case later on in the patient's life, and dates the loss of hearing and the consequent handicap to the patient's later career to this acute disease where the repeated paracenteses have destroyed this important middle ear structure; or the case becomes one of that annoying series of chronic otitis media purulentas, with all that this lesion implies in a patient's life.

Long before these problems present themselves to the patient, the pediatricist has forgotten about that case, and he looks upon his repeated paracenteses as having saved his patient an acute mastoiditis or an operation, as being all that is necessary or required of him. Dr. Kopetzky thinks it more important to bear in mind the after results than the present situation of operating or not operating upon the mastoid. Furthermore, pediatricists should recognize that a number of cases seen at their onset have in them the elements of chronicity, and perfect after results, either from paracentesis or even from mastoidectomy, even when done in the beginning stage of a chronic lesion, will not give a perfect result in the end.

In this discussion, it would not be germane to the question at issue to discuss the elements of chronicity, but every otologist knows that there are cases where these elements are present at the commencement of the lesion. There is probably no one class of ear cases which is more important from as many angles as the ear diseases of infants and children. While the immediate effect to be obtained is, of course, of great consideration, one should never forget the end result and the long life yet before these infants; and in forming surgical judgment on the given case, this aspect of the future welfare of the patient should never be left out of account.

Dr. Kopetzky congratulated Dr. La Fetra on his masterly presentation of the subject.

DR. FOWLER said that for some years he had charge of a large children's clinic, and in his opinion, what the red flag is to a bull so is the red drum to a pediatrician or to some otologists—they are impelled to rip it open. He had seen more drums opened unnecessarily than otherwise. The procedure is very much overdone. It would be well if the drum were used more for the diagnosis of rhinitis, than rhinitis be used for the diagnosis of otitis. In the same way, he had seen many mastoids diagnosed where there was no mastoiditis, but an inflammation

of the mastoid glands, due it may be to pediculi in the scalp. There is too much tendency now-a-days to do a radical procedure on the drum membrane. No acute membrane should be opened unless there is fluid or pressure behind it.

DR. LEDERMAN spoke of the importance of proper douching in acute infection of the ear. If the attendant has not had sufficient experience in using a douche with a return flow ear piece, detailed instruction should be given. He believed in local treatment to the nose and also in hot douches for the ear. He had also found the internal administration of urotropine very helpful in many cases, if used early. It is not a simple matter to decide in the case of a small child whether or not a point is tender to pressure, since the child is often unable to respond intelligently, and the condition must be determined by close observation.

DR. GERARD H. COX said he had enjoyed both papers very much but a couple of points had not been mentioned. One was the question of late mastoid tenderness, which one must watch for; after the first thirty-six hours tenderness may pass away, but a late tenderness coming on after a week is very significant of mastoid involvement. Some years ago one of the best pediatricists in town declared that too many operations were being done, and he was undoubtedly correct, for many men operate after observing a patient for two or three days only without waiting for the acute symptoms to subside. Very rarely should a mastoid be operated upon before less than eight to ten days of watching. As to the danger of chloroform, every one realizes that if chloroform is used on a case with status lymphaticus he is fortunate if the child survives.

DR. MAYBAUM said that a careful study of the drum picture is of undoubted importance in deciding upon the indications for paracentesis. He did not attach too much weight to the color of the drum membrane. The drum may be red, gray, or yellowish in color, and yet a paracentesis may be necessary. One is apt to congratulate himself as to the timeliness of the paracentesis if pus is discovered on opening the drum. In his opinion, such a paracentesis had really been done too late; the finding of pus indicates that the middle ear spaces have been over-distended, with accompanying destructive changes in the middle ear of more or less permanent character. He has been in the habit of regarding the disappearance of the short process of the malleus, together with bulging of the drum, as indication for a paracentesis. In an acute middle ear suppuration, the short process is the last anatomical landmark of the drum to disappear.

As to the possibility of having pus in the middle ear with an entirely normal drum, this is undoubtedly true. All have seen cases of latent mastoiditis with no changes whatever in the ear drum. As a rule, there is little doubt of the presence of mastoiditis in children under three years of age, as the first evidence of the condition is a subperiosteal abscess. The outer wall of the antrum in young children is very thin and readily perforated.

DR. MAYBAUM wished to call the attention of pediatricists to the importance of proper and thorough treatment of acute middle ear catarrh and the after care of attacks of o. m. p. a. These children come to the specialist for the removal of adenoids and tonsils, and on examining the ears one can determine the presence of chronic catarrhal or adhesive changes in the middle ear of considerable duration. Many of the cases of chronic middle ear catarrh seen in adult life have their forerunner in these repeated attacks of acute middle ear catarrh or suppuration in early childhood which received little or no treatment.

DR. DAVIS added his plea for conservatism in operation. These cases are opened to relieve pain and secure drainage, but in many instances a paracentesis is not necessary. A ten per cent solution of carbolic acid in glycerin is often very efficient in relieving pain and as glycerin

is hydroscopic, draining the tympanum through the drum end averts the necessity and danger of opening the drum. Many of these cases will experience almost instantaneous relief from pain and the bulging drum reverts to normal by the application of this remedy. By using a wick with this carbolic solution and letting it drain by capillary attraction, one can dispense with irrigation.

In many cases where anesthesia is required ethyl chloride is preferable; it is certainly not so dangerous as chloroform. If only one drum is to be incised and the child is very young, he prefers not to use any anesthetic at all.

Dr. CALLISON said he wished to emphasize one point that had been brought out in Dr. La Fetra's paper—the danger in the indiscriminate use of hot applications and drops to the ear. Of course, if the doctor himself is making the application, it may be free from danger, but when the applications are left to the mother or an inexperienced nurse, and are to be used repeatedly, the drum may become so blistered or changed as to leave the diagnosis in doubt unless there is very positive bulging of the drum membrane. Any drug or application that has a strong enough counterirritant effect to relieve pain is bound to effect the appearance of the drum membrane very profoundly.

As to the otoscope in diagnosis, the otologist and the pediatrician both use them constantly, but they have a duty to perform toward the child in educating the general practitioner to use it in their routine examinations. These children are, in the majority of instances, first seen by the family physician. If he is educated in the use of the otoscope, and its importance, then these acute ears will be detected at an earlier stage and with this proper attention the ear will receive earlier relief.

There seems to be a general agreement that some anesthetic should be used in doing a myringotomy. The practice, in vogue in some clinics and on the part of some practitioners, of incising a child's ear drum without it is brutal and should receive an earnest protest. His own choice is ethyl chlorid, if it is safe. The professional anesthetists have not agreed among themselves on that point, and he was not willing to commit himself. In careful hands chloroform is fairly safe, and is probably the best choice in very young infants, but vigilance is necessary; for children from six months to two years, ether is probably the best, especially under the conditions which must be met in doing so many myringotomies—that is with an inexperienced general practitioner. After the chest muscles have properly developed and the patient has the force necessary to use the chest in rebreathing, then nitrous oxide, or nitrous oxide and oxygen can be used and is free from both danger and nausea. But under conditions usually encountered, with the family physician giving the anesthetic, ether should remain first choice in spite of the nausea and severe reactions. He wished to repeat, however, that ethyl chlorid was the ideal if it is safe. The patient goes under quickly, the anesthesia is transient but profound, and the patient comes out as quickly as he went under and there is no nausea or other reaction of an undesirable nature. But the anesthetists have not yet agreed whether ethyl chlorid is a safe anesthetic.

As for the adenoid and tonsil operation for the relief of running ears—in just such cases as Dr. Kopetzky referred to as showing the elements of chronicity from the beginning—its performance is to be strongly urged. There is no other one thing that can be done that is so effective as a thoroughgoing adenoid and tonsil operation in relieving the discharge in these cases. If the ear has been running for a month or more, and the discharge is very profuse, the adenoid and tonsil operation adds very little to the danger of a mastoid involvement as an immediate consequence and if the discharge is cured, as it usually is, that danger is then entirely removed.

DR. KAHN said that there is a great responsibility, and even greater on the pediatricist than on the otologist. In most instances when the otologist sees the child after the ear has been perforated and there is a running discharge—an o. m. p. c. The children's men see these cases at an early stage and they almost always come from throat or nasal involvements, and extending into the middle ear must affect the Eustachian tube. If the drum is seen in a normal state it has a pearly appearance; as soon as there is tubal congestion there is congestion of the drum; and if watched for twenty-four hours that congestion will be increased, and in forty-eight hours there will be still more congestion, which is probably indicative of an acute progressive process in the middle ear, and if intelligent judgment is not exercised and an early incision not done the drum may burst of its own accord from increased intratympanic pressure and a permanent perforation result.

The pediatricist sees the drum early, and he should judge the signs promptly, and if possible, make an early incision, before the drum has a chance to burst of its own accord from intra tympanic pressure. When the drum bursts itself involuntarily there is more chance of a perforation remaining permanent than where a careful paracentesis has been done.

Now, regarding the question of anesthesia in these cases. Where an anesthetic is given, there is an additional risk to the child. The risk may be extremely small—but if this risk can be minimized, he believes that the surgeon should take advantage of it. Dr. Kahn stated that laughing gas to a child is not without some danger. Ether and ethyl chlorid and chloroform are probably less dangerous. However he believes that in many young children a paracentesis can be made, if carefully done with a very sharp knife, with comparatively little pain. This is not true of adults. But in very young children he believes that it can be accomplished without a general anesthetic.

DR. DWYER said that at the start the temperature is one of the best guides, and the next in importance is the successive blood counts. That is scientific, and in many children it has been the one thing that could be depended upon before examination. If there is a count and it comes down to normal, and the white blood cells gradually increase day by day, it is the best guide we have to operate.

DR. HAYS said that like every one else he believed in making the operative field as clean and sterile as possible before operating, but as a matter of fact in many of the cases treated at the clinic and in private practice he had failed to see much difference whether one cleaned the canal or not. It was important, if there was a serous discharge, not to start irrigation for twenty-four hours, but he had seen much damage done by attempting to sterilize the locality.

The pediatricist not infrequently puts the otologist in a trying position. As a rule, the otologist performs the myringotomy, and the pediatricist says he will then take care of the case, and he does so until he is so puzzled that he does not know what to do, and then the otologist simply has his story to go upon. Dr. Hays said he made no claim that if the otologist incises the ear it will get well more quickly than if the pediatricist does so; but if the otologist, after incision watches the ear and observes the signs he is better able to detect any untoward development and the patient has a better chance than if watched by the pediatricist.

He then cited a case seen recently of a child who had been under the care of a competent man. The drum was not red but had a very small point of bulging. After the physician had been away for a while the father rang up Dr. Hays and told him the child was deaf. He immediately went to the case prepared to do a myringotomy. The

drums were grey and with pus behind both, although the child had never complained of pain. After incision the streptococcus hemolyticus was found in the fluid, and the child eventually developed a sinus thrombosis. It might not have been different if the otologist had seen the case at first, but the probabilities were that the child's chances would have been better.

A bulging ear in a child is less likely to cause pain than in an adult. They can stand more tension on their drums, and perhaps for that reason only when you look you can better decide whether there is anything the matter with the drum or not.

It was most interesting to have this subject presented from two different standpoints, but he could not help feeling that the child was safer to have the drum opened if there was any evidence of bulging.

DR. LA FETRA expressed his appreciation of the full discussion his paper had received. Dr. Bass had spoken of the relation of the teeth to the ear. There is a very decided connection between the two. Dr. Bacon used to emphasize the fact that a child who was cutting his teeth was more apt to have a prolonged ear discharge.

As to the use of anesthesia in incising the ear drum Dr. Kahn who said that children did not feel the pain certainly had not seen the children the speaker had. Unless the patient is a very little baby and only one drum had to be incised, it is much wiser to give an anesthetic, and his choice after many years of experience was chloroform. He frankly confessed that he was afraid of chloroform, and if any anesthetist should tell him that he was not afraid of chloroform he would be afraid of that anesthetist. But the pediatricist is likely to be called out at four o'clock in the morning to see a child screaming with pain, and something has to be done at once, and the pediatricist has to give the anesthetic and do the paracentesis, and for all around reliance he claimed that chloroform was the best and the simplest. He had used ethyl chlorid, but on the whole preferred chloroform.

With regard to repeated paracentesis, very often it is an advantageous thing. He made no claim that it prevented a mastoid, but when a drum heals over and more fluid forms behind it and the temperature rises relief of tension is necessary; sometimes it might have to be opened two or three times, even if the child had no adenoids, and in cases where there was no question of mastoid.

As to the question of fluid passing into the throat, Dr. La Fetra said he did not know anything about experiments on the cadaver, but he had squirted water into the ear and seen it come out through the throat and nose. As for the matter of pus in a flat drum, the otologists might see that oftener than he did. He had seen pus in a flat drum in a chronic case, but the question he was discussing was acute middle ear conditions in children, and in those cases he had not seen pus behind a flat drum.

Replying to Dr. Lederman's question about urotropin, he said that he had not used it. When it was first brought out it was used at Johns Hopkins for spinal meningitis, etc., but he had never been able to understand how it would be effective on an alkaline surface, though he was willing to be guided in that by the experience of those who had used it more.

The matter of irrigation in the ear was a very important one. It should be done very carefully and just as little as possible, for in many cases there is danger of carrying infection from the outside into the middle ear. The use of the carbolic glycerin undoubtedly helps to relieve the pain, but it should not be used stronger than 5 per cent. A ten per cent solution macerates the drum to an extent that makes it very difficult to determine the exact condition.

Dr. La Fetra said he could appreciate the position in which an otologist might be placed by a man who was not as considerate as he should be and calls the otologist very late when he is afraid there is going to be a mastoid. The otologist ought to be called early, the drum ought to be incised early, and the parents should not be told that it will surely save the child from a mastoid.

DR. SAUNDERS said he had but little to add. The practice of medicine consists not only in what you do but how you do it, and he was sure Dr. Kopetzky would agree with him that some men could do more harm with one incision than others with many. He agreed with Dr. La Fetra that there are cases in which more than one incision is of distinct value.

In regard to chloroform there, too, it is not only what is used but how it is used, and those who have not had experience with chloroform had better leave it alone, but when properly used by an experienced person there is no objection to it. He himself had once incised a patient six times under chloroform anesthesia. Later the child died and was found to have a marked status lymphaticus. He had evidently been skating on thin ice, but he did not know it at the time.

As to sterilizing the canal wall, that was rather an academic question. No one has yet made tests after doing it to find out whether or not it was sterile. In his own opinion the canal is usually fairly clean, and if a sterile knife and speculum are used one can get along without an elaborate procedure in that direction.

He agreed with Dr. La Fetra and disagreed with Dr. Kahn as to the painfulness of incising the drum. It might be that Dr. Kahn is able to persuade these little patients that it does not hurt, but if he were ever to have his own ear incised he would prefer to take an anesthetic, even to take the chance of chloroform. The anesthetic is extremely important, especially in cases of threatened mastoid.

Referring to the Chairman's remarks as to the unpleasant position in which the otologist is sometimes placed in regard to these cases, he expressed the belief that that could be obviated in a large measure by having an understanding with the medical attendant at the time of the consultation. There should always be an understanding between the medical man and the otologist as to who should care for the after-treatment of a case, and if the otologist is not satisfied as to the medical man's ability he should withdraw from the case and put the entire responsibility upon the medical man, and so clear his own skirts in the matter.

SECTION OF LARYNGOLOGY AND RHINOLOGY.

February 25 1920.

Foreign Body Removed from Right Main Bronchus. DR. H. H. FORBES.

This patient was a child nearly three years of age who was admitted to the Babies' Wards of the New York Post-Graduate Hospital, December 5, 1919. At that time a diagnosis of broncho-pneumonia had been made. On December 11, to confirm the diagnosis of which there then seemed to be some doubt, an X-ray picture was taken. The result is shown in the slides—a small shingle nail in the right bronchus.

Operation December 12: Bronchoscopy No. 55 mm. Jackson type. No anesthetic. Time 3 minutes.

This case is of interest to all members of the Section, as it represents a type which is occurring constantly. First, there was the lack of history at the time of admission of the child having swallowed or inhaled a foreign body; nor could we even after the removal of the nail, get any

such history from the family. Second, it was possible to pass the tube and manipulate the forceps without the use of an anesthetic, either local or general, and this with no marked degree of pain to the child.

USE OF RADIUM IN THREE CASES.

The three cases which I now wish to report have been of interest to me and are illustrative of the use of radium where advantage has been taken of the combined work of an expert to control the use of this therapeutic agent, and where in the esophageal cases it has been possible to place the radium in the exact location of the growth by means of the esophagoscope and the immediate checking of this position by an X-ray exposure. In other words we are trying to check up for radium and for patient, giving to the patient the benefit of the technique mentioned. The radium has been under the control of Dr. Willis, and the X-ray findings under Dr. Meyer, both of the staff of the New York Post-Graduate Hospital.

II. Mr. C. C., aged 57, was referred by Dr. L. F. Crowley of Jersey City, with a history of increasing difficulty in swallowing, progressive loss in weight and strength for the past six months. Family history negative; Wassermann test negative. The X-ray showed marked canalization, shadow, and increased density—mass suggesting infiltrating new growth.

This case has improved. The weight has increased and the swallowing is better.

III. Mr. A. A., aged 45, entered the New York Post-Graduate Hospital November 11, 1919, complaining of progressive difficulty in swallowing dating back to July, when a gastrotomy was performed for feeding. The X-ray showed esophageal obstruction, the mass suggesting carcinoma. The Wassermann reaction was negative. The case has improved.

These two cases have received radium applications—25.5 mg. of radium placed in position by esophagoscopy and checked by the X-ray.

IV. Mr. M. C. was referred by Dr. Perkins, a surgical dentist on September 2, 1919, at which time there was present a mass the size of a walnut occupying the right half of the hard palate; the surface was irregular and hard; there was little if any pain. An ulcer was present, the result of the removal of a specimen for pathological examination. No bone was felt with a probe. The Wassermann reaction was negative, nor was there any history of syphilis. Pathological report: sarcoma.

Operation was advised and the patient was referred to the Post-Graduate Hospital where Dr. Willis advised radium treatment. An exposure was made on September 11, 1919.

On September 23rd, the patient was operated upon. An elliptical incision was made free from the growth, which was then removed en masse. Following the exposure to radium the mass had diminished in size. An interesting feature of the case was that the hemorrhage which was expected to be bothersome, was not excessive and was easily controlled. Pathological report; endothelioma.

Carcinoma of Laryngo-Pharynx Treated by Operation and the Use of Radium. DR. DUNCAN MACPHERSON.

This man came to my office three months ago referred by Dr. A. H. Brugman complaining of sore throat and difficulty in phonating, and with a feeling of swelling and obstruction in the region of the left tonsil; he stated that he had had the condition for fifteen months. Examination revealed a growth springing from the left pharyngeal wall at the junction of the oro- and laryngo-pharynx—peculiar in being peduncular in formation hanging over the pharyngo-epiglottic fold. Attached to the base of the pedunculated part was a cauliflower growth, which was sufficient to enable us to make a clinical diagnosis of carcinoma. It was decided to apply radium and later endeavor to remove the growth by a surgical operation. Radium under the direction of

Dr. Willis was applied three times by the indirect method, inasmuch as the growth was so located that it could not well be applied by the direct method; the first application lasted for an hour; 50 mg. were applied, eight days later 25 mg. were applied for half an hour, and the third time 25 mg. were applied for half an hour. At the end of three weeks it was decided that the growth could be removed by surgical operation. As a considerable hemorrhage was expected the neck was prepared for such a contingency.

The growth had originally been about an inch in diameter but when we operated it was about the size of a small hickory nut. A tenaculum was applied with the expectation of removing the growth with the snare, but it proved to be so soft and disintegrated so that one could not get a grip on it with the tenaculum and it was removed with the aid of the forceps. That condition was due to the radium, for at first it was hard and fibrous. When it was all removed there was a deep pit surrounded by apparently normal tissue. The radium had evidently selected the pathological area for destruction and left the normal tissue only slightly affected by the radium. The cavity was as clean as though the growth had been removed with a knife. There had been some external glandular involvement, and that, too, disappeared. At present there is some infiltration in the base of the cavity. Probably a healing fibrosis.

Only three weeks have elapsed since the operation.

DISCUSSION.

DR. G. S. WILLIS (radium therapist at the Post-Graduate Hospital) said that at the Post-Graduate Hospital it was customary to use not the emanation method but the method of applying radium with tubes small enough to apply to the particular part under treatment, varying the dosage according to the physical condition of the patient. On admission each patient receives a thorough physical examination, followed by complete blood and urine examinations. If the urine is normal, the secretion is understood to be all right; otherwise a blood chemical examination is made. It is generally recognized that in the application of radium there is more or less toxemia resultant and this toxemia is a guide as to the amount of radium used. The preliminary dose is guided by the blood and urine examination.

In the esophageal cases the patients are usually in very poor condition so that the first treatment has been the introduction of 25 mg. into the growth, letting it remain in place for twenty-four hours. The screenage is about 0.1 mm. of gold; if necessary to protect against the secondary rays, rubber is employed, but in most of the cases the passage is too small to use it. If at the end of two weeks the patient is in good condition, another treatment is given and after that a treatment is given at the end of three weeks.

Referring to Dr. Macpherson's case: Dr. Willis said that the corte operation is employed to prevent metastasis. The power of the radium to disintegrate the cell, first by causing a swelling of the cell and then breaking it down into a colloidal mass capable of being absorbed, must be considered. It is impossible for a cell in this state to have any power of reproduction, and it was hoped to be able to show that by using radium first in this manner the danger of metastasis is very greatly decreased.

(To be continued in a subsequent issue of THE LARYNGOSCOPE.)

IN MEMORIAM

Stanton Abeles Friedberg was born in Chicago, December 1, 1875. He attended the public schools of Chicago, went to the University of Michigan, 1892-1893, entered Rush Medical College, 1893, receiving his diploma from this institution in 1897. He served a one year's internship in the German Hospital of Chicago and then began the practice of general medicine.

In 1900 he began specialization in medicine and was at this time an assistant to the late E. Fletcher Ingals. In 1903 he was appointed to the Staff of the Cook County Hospital and in July of that year went to Vienna for post-graduate work until January, 1904, when he returned to Chicago and resumed his association with Dr. Ingals.

In 1906 he was named attending Oto-laryngologist to Cook County Hospital and in 1913 became Chief of the Ear, Nose and Throat Department of that institution.

In 1905 he was made Assistant Instructor at Rush in the Department of Ear, Nose and Throat. In 1907 he became an Associate in the same department. In 1913 he was Assistant Professor of Laryngology and Otology and in the same year was appointed consulting Oto-laryngologist to the Durant Hospital of the Memorial Institute for Infectious Diseases. In 1909 he began work at the Presbyterian Hospital and was later named attending Laryngologist there. In 1906 he performed his first operation in Bronchoscopy

and Esophagoscopy, this being the special work of which he often spoke of as a specialty within a specialty.

In November, 1918, he received his commission as Major in the Medical Corps, U. S. A., and served eight months in the Base Hospital, Camp Doniphan, Fort Sill, Okla., and in September, 1919, went to France with Base Hospital 85. He served eight months with the A. E. F., his time being divided between Base Hospital work in Paris and Angers. He received his discharge May 1, 1919.

He was a member of the American College of Surgeons, American Laryngological, Rhinological and Otological Society, American Peroral-Endoscopists. He was an active member of the Society of Medical History of Chicago, the American Medical Association, Chicago Medical Society, Illinois State Medical Society, Chicago Laryngological and Otological Society, American Academy of Ophthalmology and Oto-laryngology.

In 1906 he married Aline Liebman, of Shreveport, Louisiana. He leaves three children, Stanton, Jr., Jean and Louise.

One of the commentaries concerning this useful citizen and able special surgeon is that he died from the results of intracranial complications of an infected ear, conditions with which he was so thoroughly conversant and which formed so intimate a part of his professional work.

When the news of his death reached us in Boston during the meetings of the National Oto-Laryngological Associations, in which he was so keenly interested, there was regret and sorrow every-

where. His greatest personal charm was in his quiet, modest demeanor, his simple form of address and his general democracy.

I knew him well and looked forward from year to year to our short visits in the old bookshops in the vicinity of our meeting places when we attended oto-laryngological meetings together. Like all men with an original stamp, he had a hobby. He was an interested student and collector of rare and early medical books, especially those relating to his own field and work. It was quite delightful to hear him discourse on some old volume which he had ferreted out from a scrap heap in the cellars of the Washington Library, or a first edition and early publication on the Origin of Speech found in an out-of-the-way shop in Chicago or Philadelphia.

His contributions to the literature of Oto-Laryngology were valuable, original, terse, practical, helpful. Some of his best clinical work was done in the investigation of the problem of the Diphtheria Carrier. He attained recognition in that specialty of specialties in Oto-laryngology, Endoscopy, and in this field he was concentrating most of his practical efforts. Among his more important contributions to literature we may mention:

Foreign Body in the Larynx for Two and One-half Years. *Jour. A. M. A.*, Jan. 4, 1908.

Report of a Case of Rhinoscleroma. *Ill. Med. Jour.*, Aug., 1908.

Rhinoscleroma, Two Cases. *THE LARYNGOSCOPE*, Sept., 1910.

Some Esophageal Cases. *Ill. Med. Jour.*, Jan., 1912. *THE LARYNGOSCOPE*, 1912.

Direct Laryngoscopy, Joint Paper with Dr. E. Fletcher Ingals. *Tr. Amer. Laryng., Rhin. & Otol. Soc.*, 1911.

Fluoroscopic Bronchoscopy. *Jour. A. M. A.*, Feb. 21, 1914.

The Etiology, Diagnosis and Treatment of the Aural Complications of the Exanthemata. *THE LARYNGOSCOPE*, Sept., 1914.

Upper Bronchoscopy in an Infant Three Months Old for a Foreign Body. *Jour. A. M. A.*, May, 1915.

Foreign Bodies in the Respiratory Tract. *Ill. State Med. Jour.*, Sept., 1915.

Removal of Tonsils and Adenoids in Diphtheria Carriers. *Jour. A. M. A.*, March 11, 1916.

Comparative Value of Indirect and Direct Laryngoscopy. *Ill. Med. Jour.*, Sept., 1916.

Laryngology and Otology in Colonial Times. *Ann. Med. History*, Vol. 1, No. 1, 1917.

Foreign Bodies in the Esophagus. Report of Fifty Cases. *Ann. O. R. & L.*, 1917.

Operative Treatment of Diphtheria Carriers. *Tr. Amer. Lar. Soc.*, 1917.

The First Reports of Foreign Body Accidents. *Chi. Laryn. Soc.*, June, 1918. President's Address.

Diphtheria Carriers in Military Camp. *Jour. A. M. A.*, Oct. 12, 1918. Kiefer-Friedberg-Aronson.

D. Meningit. in Adenoid Tissue of the Nasopharynx. *Military Surgeon. Trans. Am. Laryn. Assn. and N. Y. Med. Record.*

Direct Laryngoscopy. *Chi. Laryn. and Otol. Soc. Symposium*, Oct. 6, 1919.

He was taken long before his field of usefulness had even reached its zenith. We will miss his quiet companionship, his wise counsel as a practical special surgeon, his valuable fund of information in our special literature, his stimulating influence and modest bearing as a man, scholar and a surgeon.

To his bereaved family and especially to his good wife, who was always his real helpmate, we extend our sincere sympathy.

M. A. G.
